


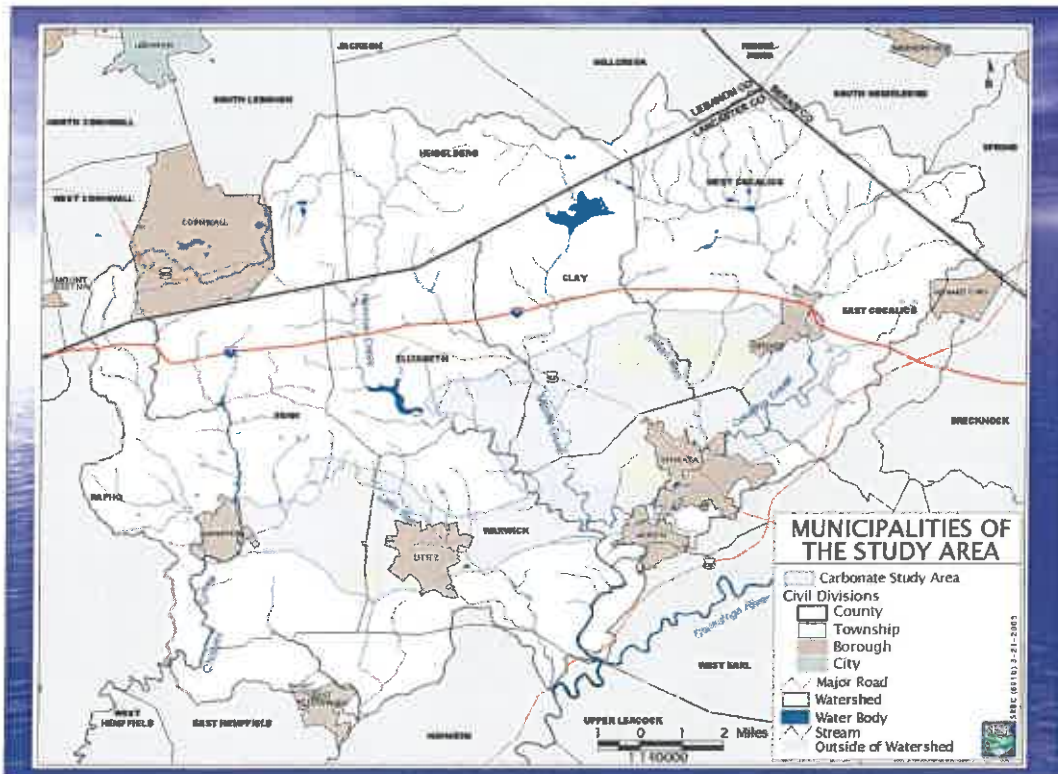
Lower Susquehanna Water Resources  
Regional Committee  
June 7, 2004

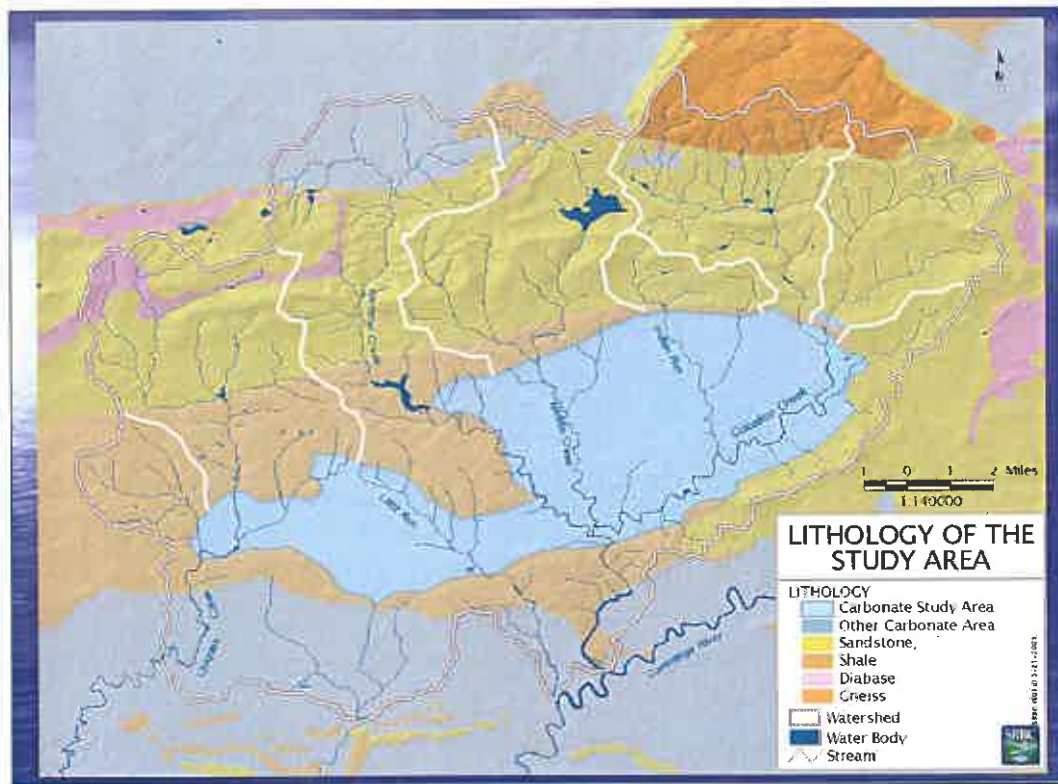
# Model Water Budget Analysis Study

January 2003 - June 2005



The Growing Greener Program logo features a green map of Pennsylvania with the text "Pennsylvania is Growing Greener" and "Growing Greener Program" to its right.





## Major Phases

- I. Public Outreach & Advisory Group
- II. Data Collection & Field Assessment
- III. Water Budget & Use Analysis
- IV. Management Recommendations
- V. Workshop

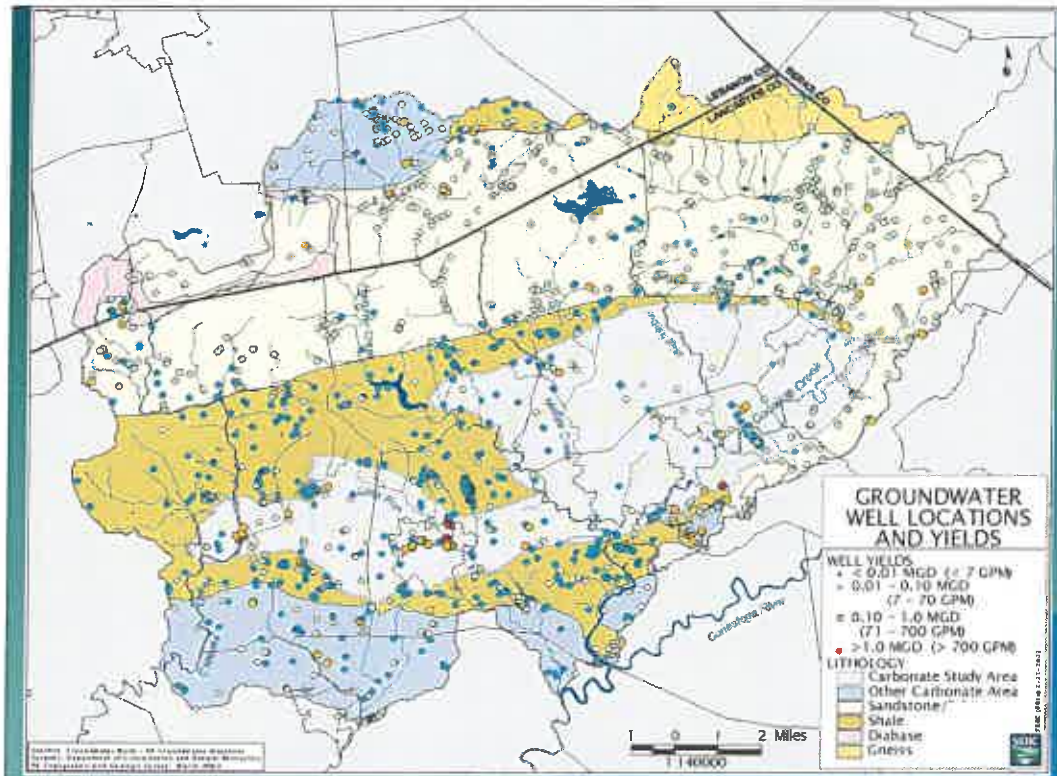
# II. Data Acquisition

**PA Topographic & Geologic Survey**  
**COMMA SEPARATED LIST OF WELLS**


Small comments to [Top Sites](#)

You have requested information on 502 Well(s). Use your browser all text except for the record list and import the list into your d


PA Well ID	Driller Well ID	Well Driller	License	Date
179863	"	"	198	"New Well", "12/17/1985
179864	"	"	"COON, GLENN"	"1098", "New Well", "
179874	"	"	319	"New Well", "2/24/1984,
180127	"	"	319	"New Well", "2/10/1984,
179869	"	"	319	"New Well", "5/5/1985, "
179880	"	"	319	"New Well", "3/30/1983,
179881	"	"	319	"New Well", "APCO"
179882	"	"	319	"New Well", "3/31/1983,
179883	"	"	319	"New Well", "4/1/1983,
179884	"	"	319	"New Well", "4/2/1983,
179885	"	"	319	"New Well", "4/2/1911,
180281	"	"	"MYERS BROS DRILLING CONTRACTORS I	
180282	"	"	"MYERS BROS DRILLING CONTRACTORS I	
179835	"	"	319	"New Well", "5/11/1983,




## II. Data Acquisition




**Field Survey**



**Stream Discharge**



**Well Water Levels**



**Well Water Levels**

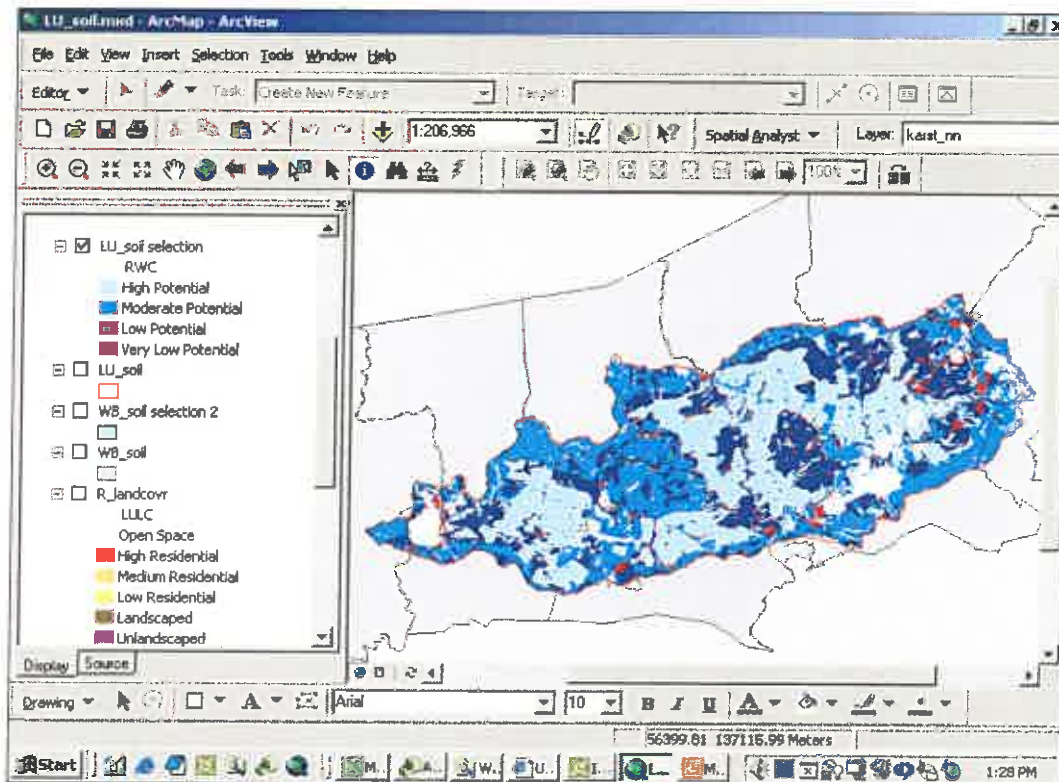
## III. Water Budget Analysis

- Modified DRBC Method
  - GW contribution to base flow
  - Locations & quantities of withdrawals
  - Import/export across basin divides

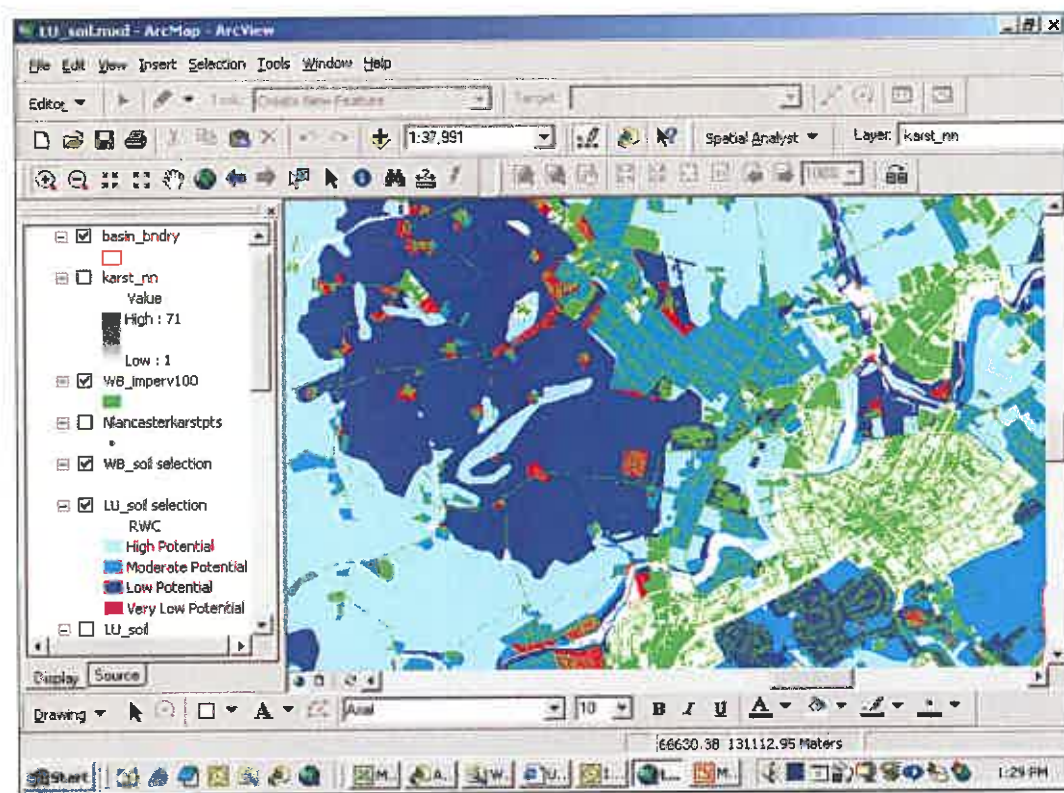
	A	B	C	D	E
1	Type of Use- Study Area	Est. Use in MGY		Baseflow Recurrence- Study Area	BFR in MGY
2	Domestic Use	41.94		2 Years	15228.3
3	Public Water Supply			5 Years	13241
4	Agricultural			10 Years	12440.4
5	Commercial			25 Years	11883.6
6	Industrial			50 Years	11641.3
7	<b>Total Use</b>				

## IV. Water Resource Mgmt. Recommendations

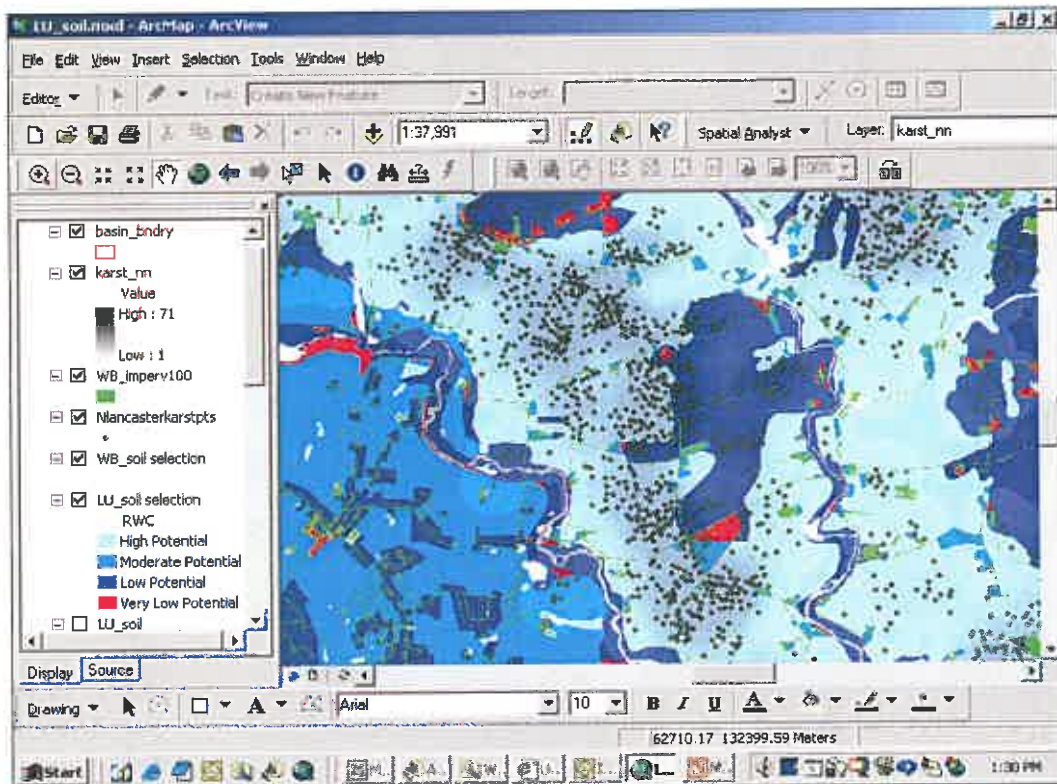
- Water budget results
- Present important water resource areas
- Review of ordinances
- Provide strategies to address issues



Slide 11



Slide 12



# V. Workshop

- Present project findings
- Water conservation practices.
- Successful storm water strategies.
- Ordinances that incorporate good practices.
- Multi-municipal approaches.

[www.srbc.net/waterbudgetstudy.htm](http://www.srbc.net/waterbudgetstudy.htm)

## Water Budget Study

Susquehanna River Basin Commission

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[Scope of Work](#)  
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[Project Timeline - Chart](#)

**WATER BUDGET ADVISORY COMMITTEE**

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## Purpose of the Project

The Susquehanna River Basin Commission (SRBC), in partnership with the Lancaster County Conservation District and five watershed groups, is spearheading a project to address water quantity issues in a 32,000-acre limestone-based area underlying parts of Chiques Creek, Cocalico Creek, and Lititz Run Watersheds in Lancaster County (see study detail map). The Lancaster County Conservation District and the Delaware River Basin Commission are both assisting with the project.

SRBC and its partners will be developing a model water budget analysis for the area that includes the communities of Manheim, Lititz, Denver, and Ephrata. Project participants will engage the local public through an advisory group and educational workshops to present results and potential implementation strategies. A vital component of any comprehensive water resources planning effort is the analysis of resource availability at the local watershed and ground water basin hydrologic scale. Input from local communities will be an important component of this project.

## ANALYZING THE AVAILABILITY OF WATER IN NORTHERN LANCASTER COUNTY

### What are the objectives of this project?

The goal of SRBC's model water budget analysis project is to identify areas where the demand for water exceeds, or is projected to exceed, available supplies. A series of water resource management recommendations also will be developed for consideration by local interests in future planning activities. The study results also will assist SRBC in assessing applications for the withdrawal of water in the project area.

### How does a water budget help identify supply-limited areas?

The water budget process considers the natural water cycle in a particular area and compares the availability of water to the amount of water that is withdrawn and used in that area. When conducting a water budget, it is very important to understand the connection between the area's ground and surface water. Ground-water aquifers can provide and receive water from surface sources. In fact, during times of drought, ground-water aquifers might be the only source of water to a

### The Water Budget Study Area



particular stream—providing the stream’s baseflow. Ground-water aquifers are also major sources of water for domestic, industrial, and agricultural uses.

During a water budget study, the contribution of ground water to baseflow is assessed and the locations of ground-and surface-water withdrawals are determined. As ground-water withdrawals increase to meet growing demands, ground-water supplies may be removed faster than the area’s natural recharge cycle—creating a water deficit.

### **What are the major components of this water budget project?**

The project is organized into five phases: (1) public outreach and advisory group; (2) data collection and field assessment; (3) water budget and water use analysis; (4) resource management recommendations; and (5) workshop. An advisory committee, involving citizen and watershed groups, will be active in all the phases.

The project is being funded largely by a \$121,000 grant from the Pa. Department of Environmental Protection’s Growing Greener Program. The timeline for the project is October 1, 2002 through June 30, 2005.

#### **Phase 1: Public Outreach & Advisory Group**

In early 2003, SRBC and the project partners will conduct a public meeting in the project area to announce the project. The purpose of this meeting is to inform local stakeholders of the objectives for this project and to solicit participation on the advisory committee to SRBC.

The advisory committee is to be comprised of representatives from system users (residential, industries, farmers), system operators (municipalities, private suppliers), municipal and county planning agencies, watershed organizations, citizen and environmental groups, and others. Committee members will be asked to provide input throughout the project and to review and offer comments on the recommendations that will be developed under Phase 4 of this project. Anyone wishing to be notified of the public meeting in early 2003 should contact Doreen McCabe at 717-238-0425, ext. 106 or by e-mail at [dmccabe@srbc.net](mailto:dmccabe@srbc.net).

#### **Phase 2: Data Collection & Field Assessment**

Prior to conducting the water use analysis, SRBC will be collecting and reviewing existing environmental data, in cooperation with the advisory committee. Existing water use data are stored in many places, in various formats, and by different agencies. Where data gaps may exist, additional field data will be collected as part of the project.

#### **Phase 3: Water Budget & Water Use Analysis**

SRBC will use and modify, as needed, a water use analysis computer program developed by the Delaware River Basin Commission and the U.S. Geological Survey. The computer program uses relational database management software that allows for water use data input, editing, updating, and output to a water use report. Results will help define the potential water shortfalls and provide input to the development of water resource management recommendations.

#### **Phase 4: Management Recommendations**

Water resource management recommendations will be prepared by SRBC and Land Studies, Inc., in cooperation with the advisory committee, and will pertain to issues and concerns identified in the water budget and water use analysis. The intent of the recommendations is to provide local governments with strategies to address water resource issues within existing township plans, county plans and local initiatives, and to help guide future activities. Topics to be addressed include practices that could be used to conserve and protect water resources, effectiveness of practices, and costs of implementation. Practices include both engineering and behavioral approaches for both system users and system operators.

#### **Phase 5: Workshop**

A public workshop will be held to present the water budget and water use report and resource management recommendations. The purpose of this meeting will be to educate the local watershed community regarding the demands on water supplies, the impacts that result, and strategies to protect and conserve those resources. For more information on the water budget project, contact Bob Edwards at SRBC, (717) 238-0425, ext. 213 or by e-mail at [redwards@srbc.net](mailto:redwards@srbc.net).

# Northern Lancaster Water Budget Study Project

## Phase 2

### Data Collection and Field Assessment

**What is a water budget study?** The purpose of a water budget study is to determine if an area's water supplies are adequate to meet current and projected water demands. A water budget study is essentially like assessing a financial account, where you determine how much water is being deposited in an area, how much is being withdrawn, and how much is available for future use. Water budgeting allows for planning and management of water resources in a sustainable manner.

**Why is it important to conduct a water budget study in Northern Lancaster County?** According to the U.S. Census Bureau, Lancaster County's population grew by 11.3 percent between 1990 and 2000. In that same period, several communities in northern Lancaster County grew even faster, including East Cocalico Township (27.5%), Denver Borough (16.5%), Ephrata Township (12.8%), Warwick Township (33.2%) and West Cocalico Township (26.2%).

The demand for water in northern Lancaster County has been increasing in direct response to the population growth – and that growth is expected to continue. It is critical that water resource managers and planners and residents in northern Lancaster County know how much water is available and what limits there may be to meet future demands.

**What is the Northern Lancaster County water budget study?** The water budget study began in October 2002 and is expected to conclude on June 30, 2005. It is a partnership effort of the Susquehanna River Basin Commission (SRBC), Lancaster County Conservation District, Pa. Department of Environmental Protection, five watershed groups, municipalities, local residents and Millersville University. For this study, SRBC is developing a model water budget analysis that will identify the extent of available water resources and areas where the demand for water may exceed available supplies. In addition, a series of management recommendations will be developed.

The study area covers six watersheds in northern Lancaster County: Cocalico Creek, Indian Run, Middle Creek, Hammer Creek, Lititz Run and Chiques Creek. The following municipalities are located entirely or in portions of the six watersheds: Akron Boro, Clay Twp, Denver Boro, East Cocalico Twp, Elizabeth Twp, Ephrata Boro, Ephrata Twp, Lititz Boro, Manheim Boro, Penn Twp, Rapho Twp, Warwick Twp, and West Cocalico Twp.

There are five key phases to the water budget project: (1) Public Outreach and Advisory Group, (2) Data Collection and Field Assessment, (3) Water Budget and Water Use Analysis, (4) Management Recommendations, and (5) Workshop. SRBC's project Information Sheet dated March 2003 includes information on all phases. **This handout addresses questions regarding the groundwater level measurement component of Phase 2, which will be conducted from March through October 2004.**

#### PHASE 2 ACTIVITIES – DATA COLLECTION AND FIELD ASSESSMENT

During Phase 2, the water budget study partners will establish the database of groundwater levels in the study area and create maps. To create the database on groundwater levels, they will compile and use existing data and collect new data – through field surveys – for areas where there currently are insufficient data to complete the water budget study.

Susquehanna River Basin Commission

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(over)

## **PHASE 2 ACTIVITIES (cont.)**

**Who will collect the groundwater level data and when?** For those areas where existing groundwater level data is insufficient, staff from SRBC will lead survey teams – usually two-person teams – to collect new data on wells. SRBC and the conservation district will partner with private landowners to collect the data from select private wells. Securing the cooperation and permission to access private property from local landowners and communities is essential to the success of the water budget project.

The survey teams will collect groundwater level measurements twice in 2004, once in the spring and once in the fall, when water levels are generally at their highest and lowest. The spring-time measurement will take place between mid-May through early June, and the fall measurement will occur around late August through early September.

**How will landowners be selected for groundwater level measurements?** Participation in this water budget study is voluntary. Landowners who choose not to participate will not lose any services or benefits as a result of their decision. Landowners who do volunteer to participate in this multi-phase water budget study will be helping residents and water management officials to better understand the region's water resources needs and demands, thereby ensuring that more educated and sound decisions are made within the northern Lancaster County area by communities and by individual landowners.

**How are groundwater levels measured and what type of information is recorded?** Once permission to access private property is obtained from a participating landowner, the trained survey teams will conduct a groundwater level measurement. The process for checking groundwater levels is fairly simple, with a clean weighted-measuring tape being the tool of choice. Similar to checking the oil level in a vehicle, the survey teams will: (1) remove the well cap, (2) lower a clean tape measure into the well to determine the depth from the surface of the ground to the top of the water (by thoroughly cleaning the measuring tape, the survey team avoids the possibility of contaminating wells), and (3) replace the well cap when the measurement is recorded.

The types of information collected and recorded include location of the well (through latitude and longitude), water level measurement and well characteristics, such as the total depth of the well and whether the well has casing or not. The landowner will be given a copy of all recorded information.

**How will the well information be used during Phase 3 of the study?** In keeping with the analogy that a water budget is like assessing a financial account, information on groundwater levels is like having the “balance sheet” for an account. The water level measurements serve as the basis for evaluating the balance in the groundwater account near the measured well. The data will be used to construct a groundwater contour map. The map serves as an indicator of the balance in the regional groundwater account. A comparison of the spring and early fall maps will be used to evaluate changes in the amount of water stored in groundwater aquifers at the end of a specific water year. This information will be compared to streamflow and precipitation records from previous years to help predict future groundwater conditions resulting from changes in precipitation, recharge and utilization.

**Will information on individual wells and participating landowners be distributed?** The groundwater level contour map will be public information, but specific information regarding participating landowners' names and addresses will not be made public. This information will be kept confidential.

**How can I obtain more information on this water budget study?** More detailed information on this project is available on SRBC's web site at <http://www.srbc.net/waterbudgetstudy.htm>, including the project scope of work, timelines and updates on recent activities.

Persons who wish to have their names added to the project mailing or e-mail lists for future announcements and project updates, contact Patricia Adams at (717) 238-0423, extension 302, or e-mail at [padams@srbc.net](mailto:padams@srbc.net). For specific questions about the water budget project, contact Bob Edwards, Project Manager at [redwards@srbc.net](mailto:redwards@srbc.net) or call (717) 238-0425, extension 213.