INSTRUCTIONS FOR COMPLETION OF KENTUCKY SPRING INVENTORY FORM

INTRODUCTION

A spring is a location or hydrologic feature where groundwater discharges from conduits, rock cavities, or gravel beds into a surface channel or body of water. Information about springs reported on these forms is incorporated in the groundwater data base maintained by the Division of Water. The data base is used to help protect and promote groundwater in Kentucky and to identify problem areas for groundwater users. Please carefully answer each question which applies to the spring. If you have any questions about this form, contact Kentucky Division of Water, Groundwater Branch, 14 Reilly Road, Frankfort, Kentucky 40601. Telephone (502)564-3410.

(1) SPRING IDENTIFICATION NUMBER

The eight-digit spring identification number is unique for each spring. If you have been assigned spring labels, attach the label to the upper right corner of the form. Print the ID number in the boxes in Section (1). If you do not have any spring labels, send the completed form to the Division of Water and an ID number will be assigned by the Groundwater Branch. DO NOT attempt to attach the label to objects in the vicinity of the spring. DO NOT use water well or monitoring well ID numbers for springs.

(3) SPRING LOCATION

Fill in the spaces for county, USGS 7.5-minute topographic quadrangle map and elevation. Leave blank the spaces for latitude and longitude, unless this information is obtained from a GPS unit.

(6) ATTACHMENTS

Indicate any attachments submitted with the spring report. Note that a location for the spring is required. You must provide either coordinates derived from a GPS unit or the location clearly marked with a spring symbol or small "X" on a topographic map. The map may be a photocopy. The photocopy does not have to cover the entire map. Only the spring location area and a part of the border of the map are needed. Latitude and longitude will be determined by the Division of Water from your map, so please be as accurate as possible.

(7) PHYSICAL SETTING

Terms are defined in each sub-section. Common or self-evident terms are not defined.

Primary Spring Type

GRAVITY SPRING - A discharge feature where groundwater drains with an open or free surface and falls out of a conduit, cave, or enlarged fracture. The spring is located somewhat above the receiving channel or body of water and generally flows without significant hydrostatic pressure.

BLUE HOLE SPRING - A karst spring or pool formed in rock or alluvium from which groundwater rises or wells up under hydrostatic pressure and flows to a stream channel or other body of water.

TRICKLE - A descriptive term for a small turbulent flow of groundwater into a surface channel or body of water. Larger than a seep, the discharge is generally less than 0.05 cfs (25 gpm).

SEEP - A localized area where water percolates, drips, or gradually flows to the land surface. A generally laminar flow of very low discharge.

Secondary Characteristics

KARST WINDOW - A karst landform or hydrologic feature where groundwater discharges from a cave or spring, flows across the bottom of a sinkhole, depression, or valley, and returns to the subsurface at a cave, swallet, or sump.

SINKING SPRING - A hydrologic feature where groundwater discharges from a cave or spring and returns to the subsurface at a cave, swallet or sump. Karst windows usually contain sinking springs, but many sinking springs flow across the land surface rather than in a depression.

EPIKARST FLOW - Shallow groundwater circulation along a weathered soil-bedrock zone where joints, fractures, and bedding-plane partings have been enlarged by dissolution of soluble rock. This groundwater flow is often perched and may discharge to local surface drainage, but generally recharges a deeper-lying karst flow system of a much larger scale.

ESTAVELLE - A karst feature that alternately functions as a sink point or a spring depending on the flow conditions of an underlying conduit network.

PERCHED GROUNDWATER - An upper groundwater flow system separated from a lower groundwater system by an impermeable or less permeable deposit or rock unit.

GRAVEL SPRING - A spring discharging from a water-bearing gravel bed or deposit.

FRACTURE - Any break or crack in rock due to mechanical failure by stress. It may or may not result in rock displacement.

Aquifer Media

ALLUVIUM - Unconsolidated debris such as mud, silt, sand, pebbles, cobbles, and boulders which has been transported and deposited by channelized running water.

Spring Discharges From

CONDUIT - A cave, linear passage, or closed channel in the subsurface, that conducts groundwater drainage. Formed by dissolution of soluble rock in the weathered zone and along bedding planes and fractures, the passage may or may not be continually filled with water.

BEDDING PLANE - A planar to undulating bedding surface that visibly separates each successive layer of stratified rock from the preceding or following layer.

CAVE - A void, passage, or conduit formed in bedrock or sediment that is large enough to be physically explored

MINE ADIT - A horizontal passage from the surface into a mine.

Spring Discharges To

. SINKHOLE - A naturally occurring pit or topographic depression with subsurface drainage, formed by soil collapse, conduit roof collapse, stream insurgence, or accelerated local dissolution of bedrock.

(8) SPRING DISCHARGE

PERENNIAL FLOW - Groundwater and stream flow that is normally present throughout all seasons of the year, although flow may cease during a period of extraordinary drought.

SEASONAL FLOW - Groundwater and stream flow that is governed by normal annual variation in precipitation and/or evapotranspiration. Springs exhibiting seasonal flow often are dry during the summer and autumn months.

INTERMITTENT FLOW - Discharge from a spring, flow in a stream channel or conduit, or surface runoff that occurs briefly as a result of significant precipitation (or snow melt) or periodically as a result of wet conditions.

Calculating Spring Discharge

Spring discharge is the volume of flow per unit of time from a spring or through an open channel, often expressed as gallons per minute (gpm), cubic feet per second (cfs) or liters per second (l/s). Spring discharge is one of the most important pieces of information to be recorded on this document. Accurate discharge data conveys the local or regional significance of the spring. Under stable hydrologic conditions, a direct relationship exists between the spring discharge and the size of the recharge area or groundwater drainage basin. This knowledge can be of vital importance during an environmental emergency.

In order to estimate the discharge (Q) of a spring being inventoried, carefully observe the channel occupied by the spring flow and try to select a location where the spring flows smoothly through a consistent cross section of channel. Estimate or measure a representative width (W) of spring flow and record this dimension on the worksheet. Next, record an average depth (D) of flow. Finally, estimate the distance which the water flows past a fixed point within a second. Record this velocity (V) as distance per second. The final discharge value is calculated as width times depth times average velocity (Q = W x D x V).

Discharge _____ = Width _____ x Depth _____ x Velocity _____

(9) SURFACE FLOW CONDITIONS

When documenting spring discharge data, the surface flow conditions must also be recorded. The season should be noted as either winter or summer and the flow condition selected as low, moderate, or high. Low flow is generally base flow and usually occurs a week or two after the last significant precipitation. High flow would be considered flood flow, when flows are strong and often turbid. Moderate flow would occur during runoff recession from flood crests but prior to return to base flow. This information is very useful for assessing the spring's significance, even if the inventory was conducted in unusual flow conditions.

(10) MODIFICATIONS

Springs may have numerous modifications; please mark all that apply. Use the Comments Section (18) to give additional information such as materials (stone, brick, concrete, etc.), approximate dimensions, and structural characteristics (one or two stories, multiple rooms, etc.).

(11) DYE TRACE INFORMATION

If any information is known concerning dye traces involving this spring, please indicate.

(12) SPRING USE

Springs may be used for multiple purposes. Mark all that apply.

DOMESTIC - Springs in this category serve as a household supply for one to three families, usually though not always through a pumped or gravity flow connection. Domestic use may or may not include use for drinking water.

UNREGULATED PUBLIC ACCESS - This category includes roadside springs from which numerous persons may transport water for domestic or other use.

PUBLIC - This category includes both public and semipublic water supplies. According to the definitions found in 401 KAR 8:010, a public water system has at least 15 service connections or regularly serves at least 25 individuals daily at least 60 days of the year. Semipublic drinking water systems serve more than three families but do not qualify as a public system.

(17) SKETCH MAP

Use this space to show the spring and associated natural and human-built features, such as nearby sinkholes; overflow routes; surface water bodies; roads; railroad tracks; farm buildings; aboveground or underground storage tanks; process lagoons; septic drainfields, feedlots, privies and other potential contamination sources. The sketch map should not be used to show driving directions to the spring.