GROUND WATER POLLUTION POTENTIAL OF CHAMPAIGN COUNTY, OHIO

BY

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GROUND WATER POLLUTION POTENTIAL REPORT NO. 39

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ABSTRACT

A ground water pollution potential map of Champaign County has been prepared using the DRASTIC mapping process. The DRASTIC system consists of two major elements: the designation of mappable units, termed hydrogeologic settings, and the superposition of a relative rating system for pollution potential.

Hydrogeologic settings form the basis of the system and incorporate the major hydrogeologic factors that affect and control ground water movement and occurrence, including depth to water, net recharge, aquifer media, soil media, topography, impact of the vadose zone media, and hydraulic conductivity of the aquifer. These factors, which form the acronym DRASTIC, are incorporated into a relative ranking scheme that uses a combination of weights and ratings to produce a numerical value called the ground water pollution potential index. Hydrogeologic settings are combined with the pollution potential indexes to create units that can be graphically displayed on a map.

Ground water pollution potential analysis in Champaign County resulted in a map with symbols and colors which illustrate areas of varying ground water contamination vulnerability. Nine hydrogeologic settings were identified in Champaign County with computed ground water pollution potential indexes ranging from 60 to 204.

The ground water pollution potential mapping program optimizes the use of existing data to rank areas with respect to relative vulnerability to contamination. The ground water pollution potential map of Champaign County has been prepared to assist planners, managers, and local officials in evaluating the potential for contamination from various sources of pollution. This information can be used to help direct resources and land use activities to appropriate areas, or to assist in protection, monitoring, and clean-up efforts.

TABLE OF CONTENTS

Page

LIST OF FIGURES

Number Page

LIST OF TABLES

Number Page

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INTRODUCTION

The need for protection and management of ground water resources in Ohio has been clearly recognized. About 42 percent of Ohio citizens rely on ground water for drinking and household use from both municipal and private wells. Industry and agriculture also utilize significant quantities of ground water for processing and irrigation. In Ohio, approximately 700,000 rural households depend on private wells; 5,087 of these wells exist in Champaign County.

The characteristics of the many aquifer systems in the state make ground water highly vulnerable to contamination. Measures to protect ground water from contamination usually cost less and create less impact on ground water users than clean-up of a polluted aquifer. Based on these concerns for protection of the resource, staff of the Division of Water conducted a review of various mapping strategies useful for identifying vulnerable aquifer areas. They placed particular emphasis on reviewing mapping systems that would assist in state and local protection and management programs. Based on these factors and the quantity and quality of available data on ground water resources, the DRASTIC mapping process (Aller et al., 1987) was selected for application in the program.

Considerable interest in the mapping program followed successful production of a demonstration county map and led to the inclusion of the program as a recommended initiative in the Ohio Ground Water Protection and Management Strategy (Ohio EPA, 1986). Based on this recommendation, the Ohio General Assembly funded the mapping program. A dedicated mapping unit has been established in the Division of Water, Water Resources Section to implement the ground water pollution potential mapping program on a county-wide basis in Ohio.

The purpose of this report and map is to aid in the protection of our ground water resources. This protection can be enhanced by understanding and implementing the results of this study which utilizes the DRASTIC system of evaluating an area's potential for ground water pollution. The mapping program identifies areas that are vulnerable to contamination and displays this information graphically on maps. The system was not designed or intended to replace site-specific investigations, but rather to be used as a planning and management tool. The map and report can be combined with other information to assist in prioritizing local resources and in making land use decisions.

APPLICATIONS OF POLLUTION POTENTIAL MAPS

The pollution potential mapping program offers a wide variety of applications in many counties. The ground water pollution potential map of Champaign County has been prepared to assist planners, managers, and state and local officials in evaluating the relative vulnerability of areas to ground water contamination from various sources of pollution. This information can be used to help direct resources and land use activities to appropriate areas, or to assist in protection, monitoring, and clean-up efforts.

An important application of the pollution potential maps for many areas will be assisting in county land use planning and resource expenditures related to solid waste disposal. A county may use the map to help identify areas that are suitable for disposal activities. Once these areas have been identified, a county can collect more site-specific information and combine this with other local factors to determine site suitability.

Pollution potential maps may be applied successfully where non-point source contamination is a concern. Non-point source contamination occurs where land use activities over large areas impact water quality. Maps providing information on relative vulnerability can be used to guide the selection and implementation of appropriate best management practices in different areas. Best management practices should be chosen based upon consideration of the chemical and physical processes that occur from the practice, and the effect these processes may have in areas of moderate to high vulnerability to contamination. For example, the use of agricultural best management practices that limit the infiltration of nitrates, or promote denitrification above the water table, would be beneficial to implement in areas of relatively high vulnerability to contamination.

A pollution potential map can assist in developing ground water protection strategies. By identifying areas more vulnerable to contamination, officials can direct resources to areas where special attention or protection efforts might be warranted. This information can be utilized effectively at the local level for integration into land use decisions and as an educational tool to promote public awareness of ground water resources. Pollution potential maps may be used to prioritize ground water monitoring and/or contamination clean-up efforts. Areas that are identified as being vulnerable to contamination may benefit from increased ground water monitoring for pollutants or from additional efforts to clean up an aquifer.

Other beneficial uses of the pollution potential maps will be recognized by individuals in the county who are familiar with specific land use and management problems. Planning commissions and zoning boards can use these maps to help make informed decisions about the development of areas within their jurisdiction.

Developers proposing projects within sensitive ground water areas may be required to show how ground water will be protected.

Regardless of the application, emphasis must be placed on the fact that the system is not designed to replace a site-specific investigation. The strength of the system lies in its ability to make a "first-cut approximation" by identifying areas that are vulnerable to contamination. Any potential applications of the system should also recognize the assumptions inherent in the system.

SUMMARY OF THE DRASTIC MAPPING PROCESS

The system chosen for implementation of a ground water pollution potential mapping program in Ohio, DRASTIC, was developed by the National Water Well Association for the United States Environmental Protection Agency. A detailed discussion of this system can be found in Aller et al. (1987).

The DRASTIC mapping system allows the pollution potential of any area to be evaluated systematically using existing information. Vulnerability to contamination is a combination of hydrogeologic factors, anthropogenic influences, and sources of contamination in any given area. The DRASTIC system focuses only on those hydrogeologic factors which influence ground water pollution potential. The system consists of two major elements: the designation of mappable units, termed hydrogeologic settings, and the superposition of a relative rating system to determine pollution potential.

The application of DRASTIC to an area requires the recognition of a set of assumptions made in the development of the system. DRASTIC evaluates the pollution potential of an area under the assumption that a contaminant with the mobility of water is introduced at the surface and flushed into the ground water by precipitation. Most important, DRASTIC cannot be applied to areas smaller than 100 acres in size and is not intended or designed to replace site-specific investigations.

Hydrogeologic Settings and Factors

To facilitate the designation of mappable units, the DRASTIC system used the framework of an existing classification system developed by Heath (1984) which divides the United States into 15 ground water regions based on the factors in a ground water system that affect occurrence and availability.

Within each major hydrogeologic region, smaller units representing specific hydrogeologic settings are identified. Hydrogeologic settings form the basis of the system and represent a composite description of the major geologic and hydrogeologic factors that control ground water movement into, through, and out of an area. A hydrogeologic setting represents a mappable unit with common hydrogeologic characteristics and, as a consequence, common vulnerability to contamination (Aller et al., 1987).

Figure 1 illustrates the format and description of a typical hydrogeologic setting found within Champaign County. Inherent within each hydrogeologic setting are the physical characteristics which affect the ground water pollution potential. These characteristics or factors identified during the development of the DRASTIC system include:

D - Depth to Water

R - Net Recharge

A - Aquifer Media

S - Soil Media

T - Topography

I - Impact of the Vadose Zone Media

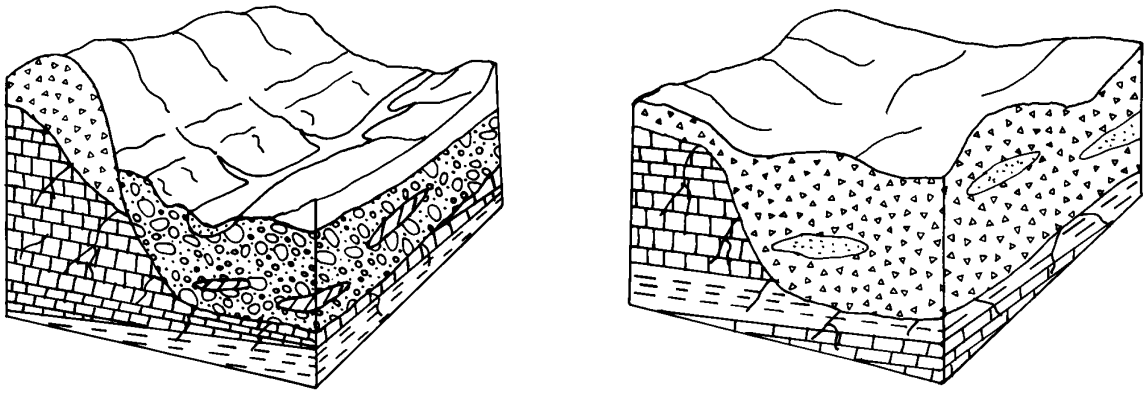
C - Conductivity (Hydraulic) of the Aquifer

These factors incorporate concepts and mechanisms such as attenuation, retardation, and time or distance of travel of a contaminant with respect to the physical characteristics of the hydrogeologic setting. Broad consideration of these factors and mechanisms coupled with existing conditions in a setting provide a basis for determination of the area's relative vulnerability to contamination.

Depth to water is considered to be the depth from the ground surface to the water table in unconfined aquifer conditions or the depth to the top of the aquifer under confined aquifer conditions. The depth to water determines the distance a contaminant would have to travel before reaching the aquifer. The greater the distance the contaminant has to travel, the greater the opportunity for attenuation to occur or restriction of movement by relatively impermeable layers.

Net recharge is the total amount of water reaching the land surface that infiltrates the aquifer measured in inches per year. Recharge water is available to transport a contaminant from the surface into the aquifer and affects the quantity of water available for dilution and dispersion of a contaminant. Factors to be included in the determination of net recharge include contributions due to infiltration of precipitation, in addition to infiltration from rivers, streams and lakes, irrigation, and artificial recharge.

Aquifer media represents consolidated or unconsolidated rock material capable of yielding sufficient quantities of water for use. Aquifer media accounts for the various physical characteristics of the rock that provide mechanisms of attenuation, retardation, and flow pathways that affect a contaminant’s ability to reach and move through an aquifer.



(a) (b)

7D Buried Valley

This hydrogeologic setting varied considerably across Champaign County. The buried valleys were created by pre-glacial or interglacial rivers which downcut deeply into the bedrock. The differing glacial deposits filling these valleys can be best illustrated by describing the two common forms or types mapped within Champaign County.

One common form of buried valley deposits (Block Diagram a) is best exemplified by the Mad River Valley. The valley is occupied by a modern river and floodplain containing abundant outwash and kame deposits, and is easy to distinguish from the surrounding till and bedrock uplands. The depth to water is usually less than 30 feet. The upper portion of the valley commonly contains 50 to 100 feet of sand and gravel outwash with minor till or fine lacustrine deposits. Yields over 500 gpm are possible from properly constructed wells. Soils are typically loams or sandy loams. The streams are usually in direct hydraulic connection with the aquifer. Recharge is typically high.

The other common form of buried valley (Block Diagram b) is best exemplified by the Teays Valley in far western Champaign County. These valleys are typically overlain by end moraines, and the rolling topography makes it difficult to distinguish the valleys from surrounding areas. They contain either intermittent streams or no streams at all. The aquifer consists of thin lenses of sand and gravel interbedded in very thick sequences of fine-grained till and lacustrine deposits. Yields are commonly less than 25 gpm. Soils are typically clay loams. Depth to water is typically greater than 50 feet. Recharge is generally moderate to low. GWPP index values for these settings are usually less than 120 and are often less than 100.

Figure 1. Format and description of the hydrogeologic setting - 7D Buried Valley

Soil media refers to the upper six feet of the unsaturated zone that is characterized by significant biological activity. The type of soil media influences the amount of recharge that can move through the soil column due to variations in soil permeability. Various soil types also have the ability to attenuate or retard a contaminant as it moves throughout the soil profile. Soil media is based on textural classifications of soils and considers relative thicknesses and attenuation characteristics of each profile within the soil.

Topography refers to the slope of the land expressed as percent slope. The slope of an area affects the likelihood that a contaminant will run off or be ponded and ultimately infiltrate into the subsurface. Topography also affects soil development and often can be used to help determine the direction and gradient of ground water flow under water table conditions.

The impact of the vadose zone media refers to the attenuation and retardation processes that can occur as a contaminant moves through the unsaturated zone above the aquifer. The vadose zone represents that area below the soil horizon and above the aquifer that is unsaturated or discontinuously saturated. Various attenuation, travel time, and distance mechanisms related to the types of geologic materials present can affect the movement of contaminants in the vadose zone. Where an aquifer is unconfined, the vadose zone media represents the materials below the soil horizon and above the water table. Under confined aquifer conditions, the vadose zone is simply referred to as a confining layer. The presence of the confining layer in the unsaturated zone has a significant impact on the pollution potential of the ground water in an area.

Hydraulic conductivity of an aquifer is a measure of the ability of the aquifer to transmit water, and is also related to ground water velocity and gradient. Hydraulic conductivity is dependent upon the amount and interconnectivity of void spaces and fractures within a consolidated or unconsolidated rock unit. Higher hydraulic conductivity typically corresponds to higher vulnerability to contamination. Hydraulic conductivity considers the capability for a contaminant that reaches an aquifer to be transported throughout that aquifer over time.

Weighting and Rating System

DRASTIC uses a numerical weighting and rating system that is combined with the DRASTIC factors to calculate a ground water pollution potential index or relative measure of vulnerability to contamination. The DRASTIC factors are weighted from 1 to 5 according to their relative importance to each other with regard to contamination potential (Table 1). Each factor is then divided into ranges or media types and assigned a rating from 1 to 10 based on their significance to pollution potential (Tables 2-8). The rating for each factor is selected based on available information and professional judgement. The selected rating for each factor is multiplied by the assigned weight for each factor. These numbers are summed to calculate the DRASTIC or pollution potential index.

Once a DRASTIC index has been calculated, it is possible to identify areas that are more likely to be susceptible to ground water contamination relative to other areas. The higher the DRASTIC index, the greater the vulnerability to contamination. The index generated provides only a relative evaluation tool and is not designed to produce absolute answers or to represent units of vulnerability. Pollution potential indexes of various settings should be compared to each other only with consideration of the factors that were evaluated in determining the vulnerability of the area.

Pesticide DRASTIC

A special version of DRASTIC was developed to be used where the application of pesticides is a concern. The weights assigned to the DRASTIC factors were changed to reflect the processes that affect pesticide movement into the subsurface with particular emphasis on soils. Where other agricultural practices, such as the application of fertilizers, are a concern, general DRASTIC should be used to evaluate relative vulnerability to contamination. The process for calculating the Pesticide DRASTIC index is identical to the process used for calculating the general DRASTIC index. However, general DRASTIC and Pesticide DRASTIC numbers should not be compared because the conceptual basis in factor weighting and evaluation differs significantly. Table 1 lists the weights used for general and pesticide DRASTIC.

TABLE 1. ASSIGNED WEIGHTS FOR DRASTIC FEATURES

Feature	General DRASTIC Weight	Pesticide DRASTIC Weight
Depth to Water	5	5
Net Recharge	4	4
Aquifer Media	3	3
Soil Media	2	5
Topography	1	3
Impact of the Vadose Zone Media	5	4
Hydraulic Conductivity of the Aquifer	3	2

TABLE 2. RANGES AND RATINGS FOR DEPTH TO WATER

DEPTH TO WATER (FEET)	
Range	Rating
0-5	10
5-15	9
15-30	7
30-50	5
50-75	3
75-100	2
100+	1
Weight: 5	Pesticide Weight: 5

TABLE 3. RANGES AND RATINGS FOR NET RECHARGE

NET RECHARGE (INCHES)	
Range	Rating
0-2	1
2-4	3
4-7	6
7-10	8
10+	9
Weight: 4	Pesticide Weight: 4

TABLE 4. RANGES AND RATINGS FOR AQUIFER MEDIA

AQUIFER MEDIA		
Range	Rating	Typical Rating
Massive Shale	1-3	2
Metamorphic / Igneous	2-5	3
Weathered Metamorphic / Igneous	3-5	4
Glacial Till	4-6	5
Bedded Sandstone, Limestone and Shale Sequences	5-9	6
Massive Sandstone	4-9	6
Massive Limestone	4-9	6
Sand and Gravel	4-9	8
Basalt	2-10	9
Karst Limestone	9-10	10
Weight: 3	Pesticide Weight: 3	

TABLE 5. RANGES AND RATINGS FOR SOIL MEDIA

SOIL MEDIA	
Range	Rating
Thin or Absent	10
Gravel	10
Sand	9
Peat	8
Shrinking and / or Aggregated Clay	7
Sandy Loam	6
Loam	5
Silty Loam	4
Clay Loam	3
Muck	2
Nonshrinking and Nonaggregated Clay	1
Weight: 2	Pesticide Weight: 5

TABLE 6. RANGES AND RATINGS FOR TOPOGRAPHY

TOPOGRAPHY (PERCENT SLOPE)	
Range	Rating
0-2	10
2-6	9
6-12	5
12-18	3
18+	1
Weight: 1	Pesticide Weight: 3

TABLE 7. RANGES AND RATINGS FOR IMPACT OF THE VADOSE ZONE MEDIA

IMPACT OF THE VADOSE ZONE MEDIA		
Range	Rating	Typical Rating
Confining Layer	1	1
Silt/Clay	2-6	3
Shale	2-5	3
LImestone	2-7	6
Sandstone	4-8	6
Bedded Limestone, Sandstone, Shale	4-8	6
Sand and Gravel with significant Silt and Clay	4-8	6
Metamorphic/Igneous	2-8	4
Sand and Gravel	6-9	8
Basalt	2-10	9
Karst Limestone	8-10	10
Weight: 5	Pesticide Weight: 4	

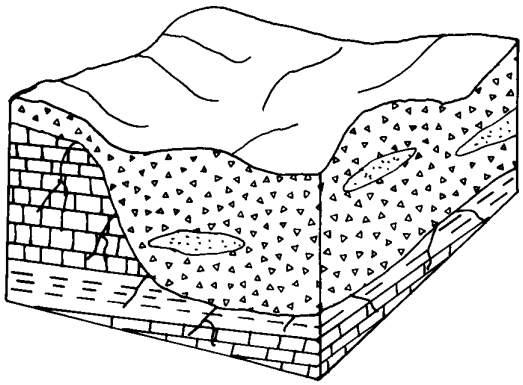
TABLE 8. RANGES AND RATINGS FOR HYDRAULIC CONDUCTIVITY

HYDRAULIC CONDUCTIVITY (GPD/FT^2)	
Range	Rating
1-100	1
100-300	2
300-700	4
700-1000	6
1000-2000	8
2000+	10
Weight: 3	Pesticide Weight: 2

Integration of Hydrogeologic Settings and DRASTIC Factors

Figure 2 illustrates the hydrogeologic setting 7D1, Buried Valley, identified in mapping Champaign County, and the pollution potential index calculated for the setting. Based on selected ratings for this setting, the pollution potential index is calculated to be 106. This numerical value has no intrinsic meaning, but can be readily compared to a value obtained for other settings in the county. DRASTIC indexes for typical hydrogeologic settings and values across the United States range from 65 to 223. The diversity of hydrogeologic conditions in Champaign County produces settings with a wide range of vulnerability to ground water contamination. Calculated pollution potential indexes for the six settings identified in the county range from 60 to 204.

Hydrogeologic settings identified in an area are combined with the pollution potential indexes to create units that can be graphically displayed on maps. Pollution potential analysis in Champaign County resulted in a map with symbols and colors that illustrate areas of ground water vulnerability. The map describing the ground water pollution potential of Champaign County is included with this report.



SETTING 7D1		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand & Gravel	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	6-12%	1	5	5
Impact of Vadose Zone	Silt/Clay	5	4	20
Hydraulic Conductivity	100-300	3	2	6
		DRASTIC	INDEX	106

Figure 2. Description of the hydrogeologic setting - 7D1 Buried Valley

INTERPRETATION AND USE OF A GROUND WATER POLLUTION POTENTIAL MAP

The application of the DRASTIC system to evaluate an area's vulnerability to contamination produces hydrogeologic settings with corresponding pollution potential indexes. The higher the pollution potential index, the greater the susceptibility to contamination. This numeric value determined for one area can be compared to the pollution potential index calculated for another area.

The map accompanying this report displays both the hydrogeologic settings identified in the county and the associated pollution potential indexes calculated in those hydrogeologic settings. The symbols on the map represent the following information:

7D1 - defines the hydrogeologic region and setting
106 - defines the relative pollution potential

Here the first number (7) refers to the major hydrogeologic region and the upper letter (D) refers to a specific hydrogeologic setting. The following number (1) references a certain set of DRASTIC parameters that are unique to this setting and are described in the corresponding setting chart. The second number (106) is the calculated pollution potential index for this unique setting. The charts for each setting provide a reference to show how the pollution potential index was derived.

The maps are color-coded using ranges depicted on the map legend. The color codes used are part of a national color-coding scheme developed to assist the user in gaining a general insight into the vulnerability of the ground water in the area. The color codes were chosen to represent the colors of the spectrum, with warm colors (red, orange, and yellow) representing areas of higher vulnerability (higher pollution potential indexes), and cool colors (greens, blues, and violet) representing areas of lower vulnerability to contamination.

The map includes information on the location of a selected observation well. Available information on the observation well is referenced in Appendix A, Description of the Logic in Factor Selection. Large man-made features such as landfills, quarries, or strip mines have also been marked on the map for reference.

GENERAL INFORMATION ABOUT CHAMPAIGN COUNTY

Champaign County is located in the west-central part of Ohio, occupying 433 square miles (Figure 3). The county seat is Urbana, which is located approximately 45 miles north, north-west of Columbus. Champaign County is bordered by Logan County to the north, Shelby and Miami Counties to the west, Clark County to the south, and Madison and Union Counties to the east. Elevations range from 1380 feet Above Mean Sea Level (AMSL) in Rush Township to 950 feet AMSL in Mad River Township. The maximum relief is 430 feet.

The population of Champaign County, according to the 1990 Census, is 36,019 (Ohio Department of Development, 1990). The population of Urbana is 11,353 (Ohio Department of Development, 1990). Agricultural activities are the main sources of employment in Champaign County. Livestock and cash crops provide the main sources of income with the manufacture of wood products contributing a minor amount to farm incomes (Richie et al., 1971). Because of the availability of large supply of ground water, several large manufacturing companies have located in the area near Urbana.

Physiography and Climate

Champaign County lies within the Till Plains section of the Central Lowlands Physiographic Province (Fenneman, 1938). Surface topography varies from gently sloping outwash terraces to the rolling hills of the eroding end moraines. Stream valleys dissect the rolling topography throughout the county.

The weather service station at the City of Urbana's wastewater treatment plant has recorded a mean annual temperature of 49.3 degrees Fahrenheit for the thirty-year period 1961-1990 (U.S. Department of Commerce, 1992) as shown in Table 9. According to Harstine (1991), precipitation increases to the south across the county. Harstine (1991) also noted that temperatures increase slightly from north to south across the county. The average precipitation value, as recorded at the Urbana wastewater treatment plant, is 38.39 inches, based on a 30-year record from 1961 to 1990 (U.S. Department of Commerce, 1992) (Table 9).

Figure 3. Location of Champaign County

Table 9. Monthly Precipitation and Temperature at Urbana 1961-1990 (United States Department of Commerce. 1992)

Month	**Precipitation** (inches) Urbana	**Temperature** (degrees Fahrenheit)
January	2.08	23.8
February	2.07	26.4
March	3.22	37.7
April	3.42	48.5
May	4.25	59.5
June	3.83	68.4
July	4.29	72.3
August	3.46	69.8
September	3.08	63.3
October	2.69	51.6
November	3.16	40.9
December	2.84	29.7
Annual	**38.39**	**49.3**

Modern Drainage

The Mad River and its tributaries drain the central portion of Champaign County. The Mad River joins the Great Miami River at Dayton in Montgomery County. The main tributaries to the Mad River are Nettles Creek, Kingscreek, Buck Creek, Muddy Creek, Gladys Creek, Bogels Run, and Machochee Creek.

The eastern third of the county is drained by the Little Darby Creek of the Scioto River drainage basin. Tributaries of Little Darby Creek in Champaign County are Spain Creek and Treacle Creek. A portion of Big Darby Creek flows through Champaign County and empties into the Scioto River.

In the far northwestern portion of Champaign County, surface flow is north-westward into the Great Miami River in Shelby and Miami Counties. Drainage is through Indian Creek, Lee Creek, and Mosquito Creek.

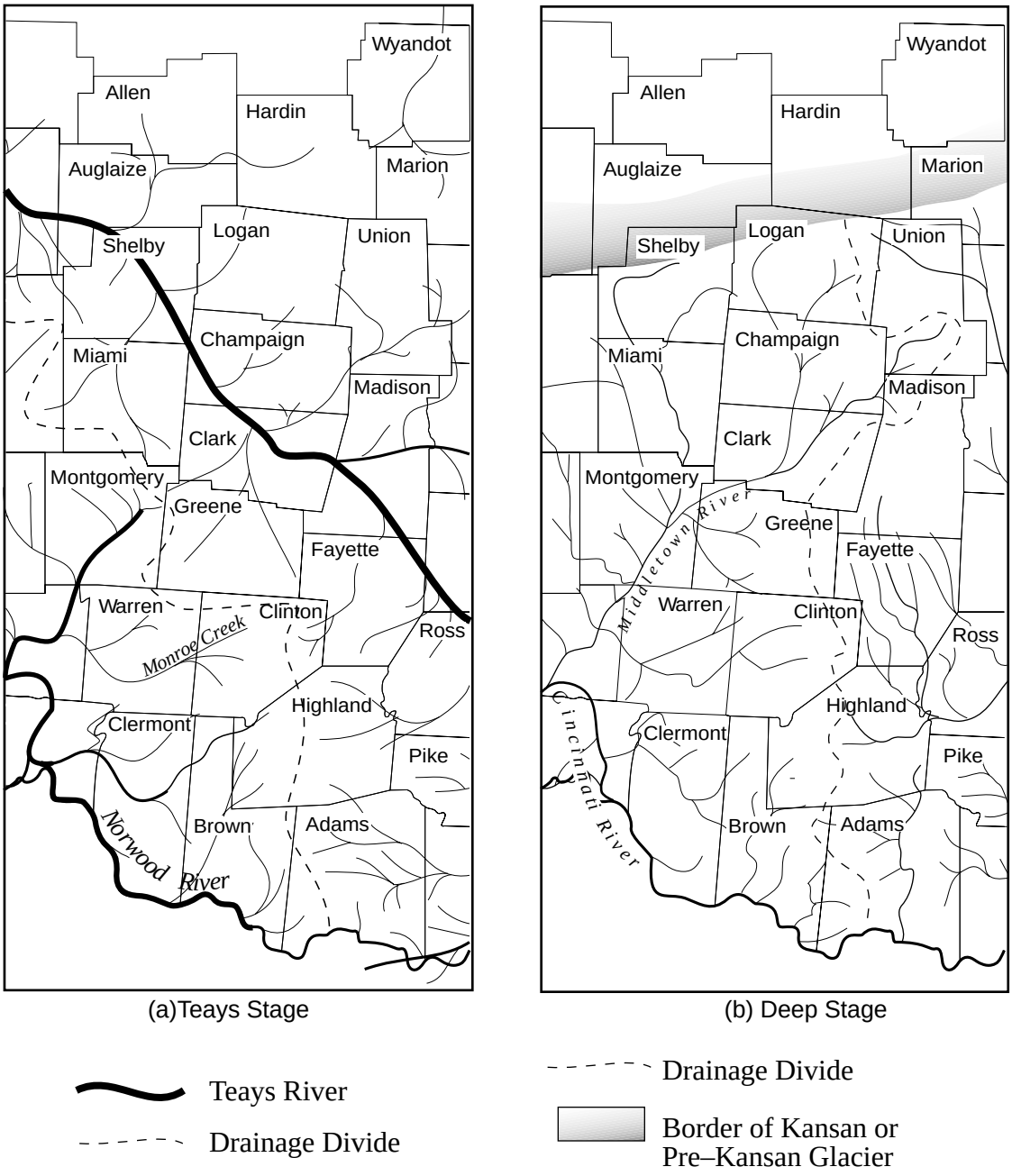


Figure 4. Teays and Deep Stage drainage in southwestern Ohio (Modified from Stout et al., 1943)

Pre- and Inter-Glacial Drainage and Topography

Prior to glaciation, the main drainage system in Ohio was the Teays River (Figure 4). The Teays River was part of a major drainage system that had its origin in the Piedmont of North Carolina and flowed through Ohio, exiting the state in Mercer County (Norris and Spicer, 1959). The Teays was a very mature river system that left broad, flat valleys in the pre-glacial bedrock surface.

The Champaign County pre-glacial bedrock surface had moderate relief except where Teays Stage drainage was present (Quinn and Goldthwait, 1979). The erosive capacity of glacial activity modified the bedrock surface. Currently, the depth to bedrock in areas that contained the main Teays drainage channel can be as much as 500 feet (Janssens, 1964).

The Teays River entered the county in Urbana Township and flowed to the northwest, exiting Champaign County through Adams Township. During the Pre-Illinoian (Kansan) glaciation, ice blocked the Teays flow causing damming and changing drainage flow directions. During this period, extensive flooding and lake formation occurred. Fine-grained sediments settled to the bottom in the stagnant bodies of water. These sediments, referred to as Minford Silts, have been found in western Champaign County during test drilling (Norris and Spicer, 1959).

Once the drainage divides were breached, a new drainage system developed with the flow changing from a northerly to a southwesterly drainage pattern. Referred to as Deep Stage, this was the beginning of an extensive period of new drainage channels and deep erosion of the bedrock surface.

During Deep Stage, Champaign County was drained by the Middletown River, which was a major tributary to the Cincinnati River (Stout et al., 1943) (Figure 4). The confluence of the Middletown River and the Cincinnati River occurred in southern Butler County (Stout et al., 1943). The Deep Stage drainage of Champaign County more closely resembles the current course of the Mad River (Kulibert, 1977).

Glacial Geology

The Pleistocene Epoch (2 million to 10,000 Y.B.P.) was a period with several distinct episodes of continental glaciation in North America, including Ohio. Four distinct episodes of ice advance occurred during the Pleistocene. Only the last two (Illinoian and Wisconsinan) have left deposits in Champaign County (Quinn and Goldthwait, 1979). Illinoian deposits are relegated to the depths of the deepest buried valleys of the pre-glacial Teays Stage drainage.

As Wisconsinan ice of the Erie Lobe advanced into southwestern Ohio, the outlier of bedrock in Logan and Champaign Counties modified the ice-path (Forsyth, 1956). The bedrock high caused the ice sheet to split into two lobes. The lobes then aligned in a north-south configuration, moving east-west across Champaign County in an interlobate pattern. The western lobe is referred to as the Miami Lobe and the eastern lobe is called the Scioto Lobe (Dreimanis and Goldthwait, 1973). The two ice sheets, advancing and retreating across Champaign County, account for the extensive nature of the deposits present.

The wide variety of glacial deposits found in Champaign County include glacial till, kames (ice-contact features), eskers, outwash, ground moraine, end moraine, and lacustrine deposits. In the modern river valleys, these deposits are covered by a mantle of recent alluvium.

Glacial till is a heterogenous, non-sorted, non-stratified mixture of sand, silt, and clay deposited directly by glacial ice. Tills can be either a melt-out "ablation" till or a compact "lodgement" till. Moving ice deposits a hard lodgement till; melting ice deposits a softer ablation till. The greatest thicknesses of till can be found in the eastern and western portions of the county. The areas with thick end moraines (Farmersville and Cable) may have over 100 feet of till, whereas till thicknesses in the center of the county on the Springfield and West Liberty Moraines are generally 20 feet or less. Ground moraine till thicknesses are quite variable, measuring from less than 20 feet to greater than 100 feet.

Ground moraines are relatively flat-lying to gently rolling upland areas composed of till with some lenses or stringers of interbedded sand and gravel. The most extensive deposits of ground moraine can be found east of the Farmersville Moraine and in the farthest eastern portions of the county, east of the Cable Moraine. Some of the surficial ground moraine is just a thin veneer of till covering extensive outwash deposits.

End or terminal moraines dominate the surficial deposits in Champaign County (Figure 5). End moraines are ridge-like structures, composed primarily of till, with rolling or hummocky terrain. From west to east the end moraines are: the Farmersville Moraine, the West Liberty Moraine, the Springfield Moraine, the Cable Moraine, and a small portion of the Powell Moraine. The Farmersville, West Liberty, and Springfield Moraines were deposited by Miami Lobe ice, and only the Cable and the Powell Moraines were deposited by Scioto Lobe ice (Quinn and Goldthwait, 1979).

Kames, eskers, and kame terraces are the major ice-contact features found within the county. Kames are irregular ridges or mounds of stratified sand and gravel deposited by flowing water in cracks and crevasses in the ice.

In Champaign County, kames join together to form terraces. Kame terrace complexes head up East Fork, Gladys Creek, Nettles Creek, and Kingscreek. The most extensive kame terrace complex in the county is located around Springhills.

Only one esker has been identified in Champaign County. An esker is formed of ridges of gravel deposited by water flowing through tunnels within or under the ice-sheet. The Siegenthaler Esker is located in northwest Harrison Township and is currently an Ohio Department of Natural Resources Nature Preserve (Ohio Dept. of Natural Resources, 1988).

Because of the configuration of the ice during the Wisconsinan glacial period, Champaign County has extensive deposits of outwash. Outwash is stratified sand and gravel layers that are deposited in front of the ice sheet by meltwater. Quinn and Goldthwait (1979) have identified three distinct outwash layers.

The oldest and highest layer is the Kennard Outwash. Known as the Clifton Outwash in Clark County, the Kennard Outwash can be traced from southern Logan County to Clifton Gorge in Greene County.

The Urbana (or Intermediate) Outwash is concentrated in the east of the Springfield Moraine in the Kingscreek-Urbana area. As with the Kennard Outwash, much of the Urbana Outwash is buried beneath the Springfield Moraine. No ice contact features are associated with this outwash (Quinn and Goldthwait, 1979).

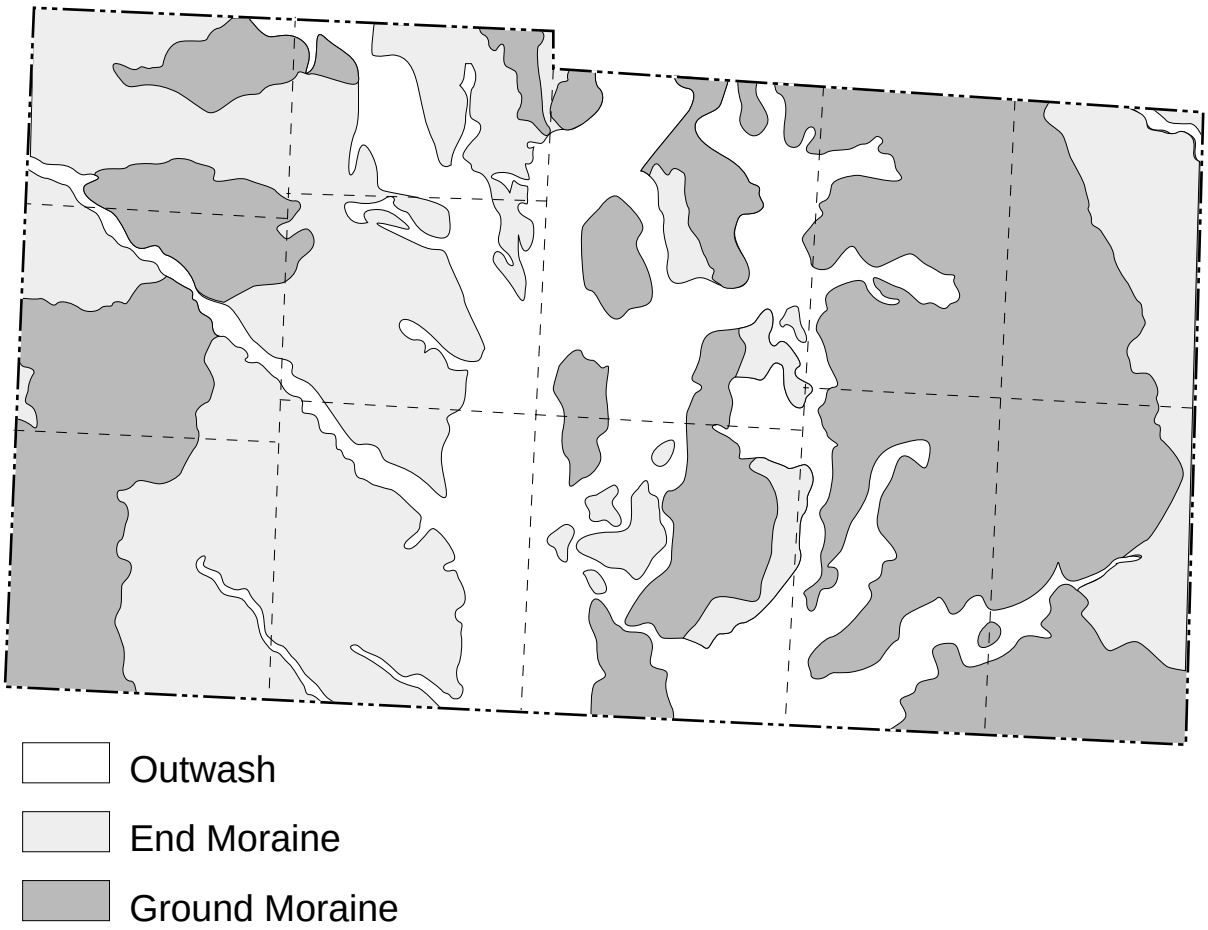


Figure 5 Generalized Glacial Geology of Champaign County (Modified from Quinn and Goldthwait, 1979)

The Mad River Valley Train flows from the Zanesfield area in Logan County to the Great Miami River at Dayton in Montgomery County, making it the largest outwash deposit in Ohio (Quinn and Goldthwait, 1979). Valley Train deposits are the same as outwash, except that they are confined to previous drainage channels.

The Farmersville Moraine runs north-south in the western portion of the county. This moraine is not underlain by the thick outwash found elsewhere (Quinn and Goldthwait, 1979). The buried Teays River Channel passes under this moraine, making the depth to bedrock greater than 500 feet in some areas (Norris and Spicer, 1958).

The West Liberty Moraine runs north to south in the middle of the county. This moraine is a thin veneer of glacial till covering extensive outwash deposits at depth.

The underlying outwash is continuous with the Urbana Outwash (Quinn and Goldthwait, 1979). Till found below the outwash may represent a pre-Wisconsinan deposition. Quinn and Goldthwait (1979) referred to these deposits as early Wisconsinan in age. Subsequently, Eyles and Westgate (1987) stated that early Wisconsinan, Erie Lobe ice never reached Champaign County. Therefore, these materials will be referred to as pre-Wisconsinan.

The Springfield Moraine, like all the end moraines in Champaign County, runs north to south. The till mantle is very thin, covering extensive Kennard Outwash deposits (Quinn and Goldthwait, 1979). Till found at depth is probably of early Wisconsinan age (Quinn and Goldthwait, 1979). Kettle lakes are found on the Springfield Moraine, indicating the overlap of Miami Lobe ice in the northeast corner of Urbana township (Quinn and Goldthwait, 1979).

The Cable Moraine runs north-south and is located in the easternmost portion of the county. The Cable Moraine is a composite of several moraines located north of Champaign County that come together as correlated by boulder counts (Quinn and Goldthwait, 1979). Drift thicknesses on the Cable Moraine are quite extensive, ranging from 20 feet to greater than 300 feet east-southeast of the City of Cable (Quinn and Goldthwait, 1979).

The Powell Moraine is located in the far northeast corner of the county and, because of its small size, is not important to the glacial geology of the county.

Lacustrine deposits of fine laminated sand, silt, and clays are present northeast of Urbana (Quinn and Goldthwait, 1979). Janssens (1964) found the thicknesses of these sediments to range from 4 to 15 feet. Other more localized lacustrine deposits undoubtedly exist within the county.

Bedrock Geology

The consolidated deposits of Champaign County are of Ordovician, Silurian, and Devonian ages. Because of the extensive glacial deposits and depth to the bedrock surface in most areas, very few bedrock exposures are present in the county. The extensive glacial activity has greatly modified the bedrock surface in Champaign County. The presence of the exceptional sand and gravel aquifers at shallow depths means very few water wells have been drilled deeply enough to encounter bedrock.

The Ordovician Bedrock, found below Teays Stage drainage, is an interbedded shale, limestone, and dolomite. The shale is grayish-red, dolomitic, and measures up to sixty feet thick (Swinford and Slucher, 1995). The limestone is fossiliferous with sparse, vuggy topography. The dolomite contains shale clasts with fossil fragments and calcite-filled vugs (Swinford and Slucher, 1995).

Silurian Limestones and Dolomites are present in Champaign County and serve as valuable aquifers at several locations. Silurian rocks in the eastern half of the

county are of the Tymochtee, Greenfield, and Salina undifferentiated Formation (Table 10). In the western portions of the county, the Silurian bedrock is referred to as the Salina Group (Table 10) (Swinford and Slucher, 1995).

The Tymochtee is a light- to medium-gray dolomite with zones of vugs lined with dolomite and evaporites (Swinford and Slucher, 1995). Most of the porosity is fracture controlled.

The Greenfield is a light-gray crystalline dolomite. Some vugginess is present. Near the upper and lower contacts, extensive solution-enlarged fractures are present (Swinford and Slucher, 1995).

The Salina undifferentiated is a yellowish-gray, slightly cherty dolomite. Porosity is fracture-controlled with zones of extensive intercrystalline vugginess (Swinford and Slucher, 1995).

The Salina Group is composed of light-gray to yellowish-brown, finely crystalline dolomite (Swinford and Slucher, 1995). This dolomite has some vuggy areas, but secondary porosity is controlled by fractures.

The Ordovician-aged rocks in Champaign County are found in the deep buried valleys, such as Teays Stage drainage. These rocks consist of blue-gray calcareous shale interbedded with thin limestones. No exposures of Ordovician rocks are present in Champaign County. These rocks are covered by large thicknesses of drift and are described based on their distribution in Clark County and elsewhere in southwestern Ohio.

Table 10 Generalized Bedrock Stratigraphy of Champaign County (Schumaker, 1991 a,b; Schumaker and Slucher, 1994;, Swinford, 1991 a,b;, Swinford, 1992 a,b,c,d,e,f,g,h; Swinford and Slucher, 1994 and 1995)

SYSTEM	SERIES	FORMATIONS	
		Western half of county	Eastern half of county
DEVONIAN	Upper	Ohio Shale	
	Middle	Columbus–Lucas Undifferentiated	
SILURIAN	Upper	Salina Undifferentiated	Salina Undifferentiated Tymochtee Greenfield
ORDOVICIAN	Upper	Undifferentiated Ordovician	

The Devonian rocks present in Champaign County are limited to the southernmost extent of the Bellefontaine Outlier. These rocks comprise the vadose zone in some areas, but do not serve as aquifers in Champaign County.

Hydrogeology

Ground water in Champaign County is obtained mainly from the unconsolidated glacial aquifers, but some bedrock aquifers exist. Sand and gravel aquifers are found throughout the county, while bedrock aquifers were only mapped in the northeast in a small part of the Kingscreek area and in the southwest portion of the county.

The glacial deposits varied from deep, outwash-filled buried valleys to sand and gravel interbedded in glacial till in end moraines.

An extensive network of buried valleys is present in Champaign County. Most of these valleys have at least some coarse material, but they may also have silts, clays, and glacial tills. Modern rivers overlie many of the ancient buried valleys.

The thickest sequences of outwash are generally found in the current course of the Mad River. The outwash deposits in direct communication with the Mad River have the potential to produce up to 1000 gallons per minute to properly constructed, large-diameter wells (Schmidt, 1985). Outwash deposits not directly connected to a surface stream are still capable of large yields in areas where the deposits are coarse and thick.

Yields from sand and gravel deposits outside the Mad River Valley range from a low of 3 to 8 gallons per minute, to a high of 100 to 300 gallons per minute to properly constructed wells (Schmidt, 1985). In some of the end moraines, sand and gravel may be interbedded in the glacial till. The best yields are obtained where the deposits are thick and coarse. However, there is typically very little areal extent to these deposits and a large amount of non-water bearing clay may be present.

The bedrock aquifers are Silurian-aged limestones; Devonian-aged limestones, and shale; and Ordovician-aged limestones, dolomites, and shales present below the deep buried valleys.

The Silurian limestones will yield sufficient water for residential supplies. Movement of water through the bedrock occurs via a fracture system. Water travels mainly through joints, fractures, and bedding planes with little movement through the matrix of the rock. The Silurian Carbonate is present in much of the county at depth, but the presence of thick permeable outwash deposits preclude its use.

The Devonian-aged limestones, dolomites, and shales are associated with the Bellefontaine Outlier. The Devonian formations are found in the northern part of the county, east of the Mad River. The depth to bedrock is shallow, and no sand and gravel is present. Some residential wells are finished in the Devonian rocks, with yields that are rated as 3 to 8 gallons per minute (Schmidt, 1985).

The Ordovician bedrock is present at the bottom of the deep buried drainage channels and is not used as an aquifer in Champaign County. The Ordovician bedrock is considered a non-water-bearing unit in the rest of southwestern Ohio.

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APPENDIX A

DESCRIPTION OF THE LOGIC IN FACTOR SELECTION

Depth to Water

Depth to water in Champaign County was based on water well data on file at the Ohio Department of Natural Resources, Division of Water, Water Resources Section; Kaser (1962); Schalk (1987); United States Geologic Survey topographic maps, United States Geologic Survey (1991); Ohio Department of Natural Resources, Division of Water, unpublished data; Ground Water Province I, Upper Mad River (1971); field measurements collected from the Mad River Non-Point Source Project; and other direct field observations. Static water levels, recorded on water well logs, were the main source of depth to water data.

All Champaign County aquifers were determined to be unconfined or semi-confined. However, the DRASTIC system recognizes only confined or unconfined aquifers. Because semi-confined aquifers in Champaign County more closely resemble unconfined conditions rather than confined conditions, all aquifers in the county were rated as unconfined.

Water levels in the uplands region in the setting Glacial Till Over Bedded Sedimentary Rock (7Aa) were 50-75 feet (a DRASTIC rating of 3) below the surface. The depths were controlled by the presence of the Bellefontaine Outlier in which Devonian age limestones and shales compose the aquifer materials. The relatively large depth to water numbers in the setting were also controlled by the steep topography of the settings.

In areas with Glacial Till Over Limestone (7Ac), water depths varied from 5 -15 feet (9) to 100+ feet (1). The presence of such a wide variety of values reflects the variability within the distribution. Some of the larger values indicate wells drilled through a large amount of glacial drift into limestone bedrock, creating very deep wells. The shallower depth to water ratings are mainly found in locations where the bedrock surface is shallow, creating an elevational control on the depth to water.

The ratings for Sand and Gravel Interbedded in Glacial Till (7Af) ranged from 5-15 feet (9) to 100+ feet (1). The areas where glacial moraines cover buried valley deposits show an increasing amount of glacial till present, and their depth to water values are extremely deep. Sand and gravel deposits near valleys and under semi-confined conditions produce the shallower depth to water values.

Outwash deposits (7Ba and 7Bc) had depth to water values ranging from 0-5 feet (10) to 30-50 feet (5). Since these deposits are found in the valleys, a shallow depth to water is expected. The settings in which the depth to water was given a rating of five (5) occurred in areas where glacial till covered the outwash deposits.

Depth to water in the Buried Valley setting (7D) ranged from 0-5 feet (10) to 100+ feet (1). The wide variability in this setting is attributable to the Buried Valley setting used in morainal areas as well as parts of the current Mad River channel with its shallow water table. The water table in the Buried Valley setting shows some confinement in the uplands areas.

Settings 7Ec, 7Ed, and 7Ee are all alluvium over bedrock, sand and gravel, and outwash, respectively. All the depth to water values ranged from 5-15 feet (9) to 15-30 feet (7). Since these are stream controlled alluvial environments, the shallow depth to water reflected river stage as expected.

Net Recharge

The values used for net recharge were determined by the use of the following references: Feulner (1960 and 1961), Feulner and Hubble (1960), Goldthwait et al. (1961), Harstein (1991), Jones (in progress), Koltun (1994), and Quinn and Goldthwait (1979). Net recharge is best defined as the amount of water that replenishes the aquifer system. The average value for recharge state-wide is approximately 6 inches per year (Pettyjohn and Henning, 1979). Precipitation minus runoff and evapotranspiration by plants accounts for the net recharge to the aquifer. The factors that control the amount of recharge are soil composition, slope, depth to water, and the vadose material above the aquifer. Permeable soils, such as sandy loams, will increase the recharge of the aquifer by allowing precipitation to infiltrate the surface instead of ponding or running off. The slope of the land controls how long precipitation is on the surface to infiltrate into the ground water supply. Flat-lying ground has greater recharge rates than highly sloping terrain. The depth to water also influences the rating of recharge rates. A shallow water table will have a higher rating for recharge than an area with a greater depth to water. If the soils and vadose materials are very permeable, recharge rates will be higher. Areas with thick, clay-rich glacial till have lower recharge rates. The number and size of fractures in the glacial till and in the bedrock also influence rates of recharge.

The Glacial Till Over Bedded Sedimentary Rock setting (7Aa) has recharge values of 0-2 inches per year (in/yr) (a DRASTIC rating of 2) and 2-4 in/yr (3). Both values reflect the greater depth to water and the low permeability material that is found in the vadose zones of these areas.

The Glacial Till Over Limestone setting (7Ac) has recharge values ranging from 2-4 in/yr (3) to 7-10 in/yr (8). The 2-4 in/yr settings are found mainly in uplands areas where deep limestone occurs with greater depth to water values. The 7-10 in/yr values occur where the vadose zone is composed of sand and gravel and the depth to water is very shallow.

The Outwash settings (7Ba and 7Bc) have recharge rates ranging from 2-4 in/yr (3) to 10+ in/yr (9). Sheets and Yost (1994) report recharge rates of 11 to 21 inches per year in the Mad River. Low recharge values were recorded in areas where the outwash was buried under a significant amount of glacial till. The high recharge values occur where the water table is shallow, the soil type is sandy loam, and the vadose zone is mainly sand and gravel.

Values of 0-2 in/yr (1), 2-4 in/yr (3), and 4-7 in/yr (6) are found in the Sand and Gravel Interbedded in Glacial Till setting (7Af). Slope, depth to water, and materials composing the vadose zone controlled the ratings.

Recharge rates within the Buried Valley setting (7D) varied greatly. These rates range from 2-4 in/yr (3) in the uplands areas with large slopes and greater depth to water values, to 10+in/yr (9) in flat-lying outwash valleys with shallow depths to water and sandy loam or peat soils at the surface.

The alluvial settings (7Ec, 7Ed, and 7Ee) all had recharge rates of either 4-7 in/yr (6) or 7-10 in/yr (8). These values reflect the shallow water tables, flat topography, and the relatively permeable nature of the soils and vadose zone materials. Where shallow bedrock was encountered in an alluvial setting, fracturing of the upper portion of the bedrock surface was assumed.

Aquifer Media

Aquifer media were evaluated primarily from water well logs on file at the Department of Natural Resources, Division of Water. Additional information was contributed by Dumouchelle and deRoche (1993); Feulner (1960 and 1961); Janssens (1964); Jones (in progress); Quinn and Goldthwait (1979); Schmidt (1982, 1985, 1991); Struble (1987a,b); Swinford (1991a,b,c) and (1992a,b); Vormelker (1990a,b), (1991 a,b,c,d), and (1992); Vormelker and Swinford (1992a,b); and Walton and Scudder (1960).

The aquifer rating for Glacial Till Over Bedded Sedimentary Rock (7Aa) was a three (3). This reflects the poor water-producing capacity of the Ordovician bedrock.

The Glacial Till Over Limestone setting (7Ac) has a rating of (6), as the limestone was the best bedrock aquifer in the county. Most bedrock wells are not cased deeply in the rock and the upper surface is fractured and weathered, producing a zone of higher porosity and permeability.

Sand and Gravel Interbedded in Glacial Till (7Af) has ratings of (5), (6), (7), and (8). Variations were based on well yields and thickness of the deposits.

Outwash (7Ba and 7Bc) has ratings of (7), (8), and (9). All outwash aquifers were high-yielding, but the highest ratings were given when the aquifer was in direct connection with a surface stream.

Buried Valleys (7D) have ratings of (5),(6),(7),(8), and (9). Low values for sand and gravel were found in the uplands versus the high values recorded in the outwash-filled valleys.

The Alluvial aquifers have ratings of (6) for limestone and (5), (6), (7), or (8) for the sand and gravel aquifers. Alluvial sand and gravel aquifers with large values were underlain by extensive outwash deposits.

Soils

The information used for soil analysis was the Soil Survey for Champaign County (Richie et al., 1971). Texture, organic content, permeability, and shrink/swell potential were used to give a DRASTIC rating to the first six feet of the soil profile.

Soils in the Glacial Till Over Bedded Sedimentary Rock setting (7Aa) were given a rating as clay loam (3). These soils have their origin in till-based ground moraine, giving them a high clay content.

In the Glacial Till Over Limestone setting (7Ac), soils were assigned ratings as clay loam (3) and sandy loam (6). Clay loam soils were formed in till-based ground moraine. Sandy loam soils have outwash parent material that comprises the vadose zone in areas where the depth to bedrock is relatively shallow.

In the Sand and Gravel Interbedded in Glacial Till setting (7Af), soil types were given ratings as clay loam (3), silt loam (4), sandy loam (6), shrink/swell clay (7), and sand (9). Sand and gravel in glacial till is found throughout the county in a variety of settings.

Table 11. Champaign County Soils

Soil Name	DRASTIC Rating	Soil Media
Algiers	4	silt loam
Brookston	3	clay loam
Carlisle	8	peat
Casco	9	sand
Celina	3	clay loam
Crosby	3	clay loam
Edwards	8	peat
Eel	4	silt loam
Fox	6	sandy loam
Fox-Miami	6	sandy loam
Genesee	4	silt loam
Henshaw	4	silt loam
Homer	6	sandy loam
Ionia	4	silt loam
Kane	4	silt loam
Kendallville	3	clay loam
Linwood	8	peat
Lippincott	6	sandy loam
Miami	3	clay loam
Miami-Lewisburg	3	clay loam
Miami-Rodman	6	sandy loam
Miami-Casco-Rodman	6	sandy loam
Ockley	6	sandy loam
Patton	7	shrink/swell clay
Rodman	6	sandy loam
Ross	4	silt loam
Shoals	4	silt loam
Sloan	4	silt loam
Sloan-variant	6	sandy loam
Uniontown	4	silt loam
Wallkill	8	peat
Warners	2	muck
Warsaw	4	silt loam
Wea	6	sandy loam

The outwash settings (7Ba and 7Bc) have soils with ratings of clay loam (3), silt loam (4), sandy loam (6), shrink/swell clay (7), peat (8), and sand (9). Soil types were extremely variable in the outwash setting. Outwash is found in river valleys, under end moraines, and under bog areas in addition to the regular valley-train deposits.

Soils classified for the buried valley settings were given ratings of clay loam (3), silt loam (4), sandy loam (6), shrink/swell clay (7), peat (8), and sand (9). Buried valley settings varied from till-based uplands to outwash-filled valleys.

In the alluvial settings (7Ec, 7Ed, and 7Ee), soils were given ratings of silt loam (4), sandy loam (6), shrink/swell clay (7), and peat (8). The shrink/swell clays and the peat soils are found in kettle lake and peat bog areas.

Topography

Topography was evaluated using 7-1/2 minute topographic quadrangle maps. Topography was then converted to slope percentages which were used for the rating process.

In Champaign County, the flat-lying nature of the floodplains of current river valleys and buried river valleys have a slope of 0-2 percent (10). Areas of ground moraine have slope values of 0-2 percent (10), 2-6 percent (9), 6-12 percent (5), and 12-18 percent (3). Some of the greater slopes were caused by stream dissection of ground morainal areas. End moraines have slopes of 0-2 percent (10), 2-6 percent (9), 6-12 percent (5), 12-18 percent (3), and 18+ percent (1). Again, current stream dissection is a controlling factor for slope changes.

Impact of the Vadose Zone Media

The vadose zone is the unsaturated layer where any water present is at less than one atmosphere of pressure and is held in place by capillary action. The vadose zone was analyzed by using data and information from water well records on file with the Ohio Department of Natural Resources, Division of Water; Schmidt (1982, 1985, and 1991); Feulner (1960); Goldthwait et al. (1961); Jones (in progress); Hill (1878); Janssens (1964); Quinn and Goldthwait (1979); Struble (1987a,b); Swinford (1991a,b,c and 1992a,b); Vormelker (1990a,b; 1991 a,b,c,d; and 1992); Vormelker and Swinford (1992a,b); and field observations.

Vadose zone values for Champaign County ranged from (4) to (8). Glacial till, when used as the vadose zone, was rated as a (4), (5,) or (6). A rating of 4 was given in areas with large thicknesses of clay-rich till without the presence of sand seams. The ratings of (4), (5), and (6) were assigned in areas with variable-sized sand zones present within the till. Sand and gravel with significant silt and clay was given ratings of (4), (5), (6), and (7). In some instances, the vadose material was outwash sand and gravel deposited over bedrock or other lower yielding deposits. Otherwise, the higher rated vadose areas were sand and gravel with the presence of some finer grained material mixed in. Sand and gravel vadose materials were assigned ratings from (5) to (8). These vadose deposits were determined to be a little cleaner than the sand and gravel with significant silt and clay. Ratings of (7) and (8) were given in the coarse outwash areas of the county. A vadose rating of (4) was used for the till above the Ordovician limestone, dolomite, and shale on the outlier.

Hydraulic Conductivity

Hydraulic conductivity data were evaluated using Dumouchelle et al. (1993), Driscoll (1986), Fetter (1988), Feulner (1960 and 1961), Hill (1878), Janssens (1964), Jones (in progress), Koltun, (1994), Quinn and Goldthwait (1979), Richards et al. (1973), Schmidt (1985), Sheets and Yost (1994), Stout et al. (1943), Struble (1987), Walton and Scudder (1960), and USGS (1991).

Hydraulic conductivity is the ability of an aquifer to transmit water. This property is dependent on the natural properties of the aquifer material. The lowest hydraulic conductivity values were in (7Aa), the interbedded limestone and shale settings, with conductivity values of 1-100 gallons per day per foot squared (gpd/ft^2); they were given a rating of (1). The Silurian limestones and dolomites (7Ac and 7Ec) were given conductivity values of 300-700 gpd/ft^2 with a rating of (4). The sand and gravel deposits had a wide variety of conductivity values in Champaign County. The sand and gravel varied from thin, isolated lenses to thick, areally extensive outwash deposits. The conductivity values range from 100-300 gpd/ft^2 with a rating of (2), to 2000+ gpd/ft^2 with a rating of (10).

APPENDIX B

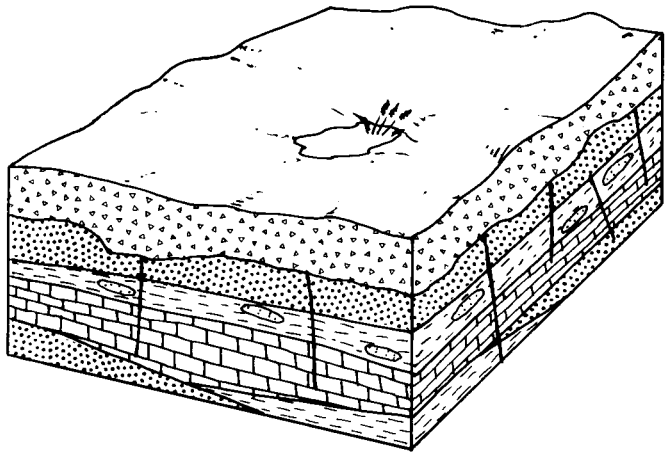
DESCRIPTION OF HYDROGEOLOGIC SETTINGS AND CHARTS

Ground water pollution potential mapping in Champaign County resulted in the identification of six hydrogeologic settings within the Glaciated Central Region. The list of these settings, the range of pollution potential index calculations, and the number of index calculations for each setting are provided in Table 14. Computed pollution potential indexes for Champaign County range from 60 to 204.

Table 12. Hydrogeologic Settings Mapped in Champaign County, Ohio.

Hydrogeologic Settings	Range of GWPP Indexes	Number of Index Calculations
7Aa-Glacial Till Over Bedded Sedimentary Rocks	60-75	2
7Ac-Glacial Till Over Limestone	76-144	23
7Af-Sand and Gravel Interbedded in Glacial Till	75-156	70
7Ba-Outwash	112-200	29
7Bc-Outwash Over Limestone	154	1
7D-Buried Valley	70-204	139
7Ec-River Alluvium Over Sedimentary Rocks	132-150	5
7Ed-River Alluvium Over Glacial Till	131-186	13
7Ee-River Alluvium Over Outwash	178	1

The following information provides a description of each hydrogeologic setting identified in the county, a block diagram illustrating the characteristics of the setting, and a listing of the charts for each unique combination of pollution potential indexes calculated for each setting. The charts provide information on how the ground water pollution potential index was derived and are a quick and easy reference for the accompanying ground water pollution potential map. A complete discussion of the rating and evaluation of each factor in the hydrogeologic settings is provided in Appendix A, Description of the Logic in Factor Selection.



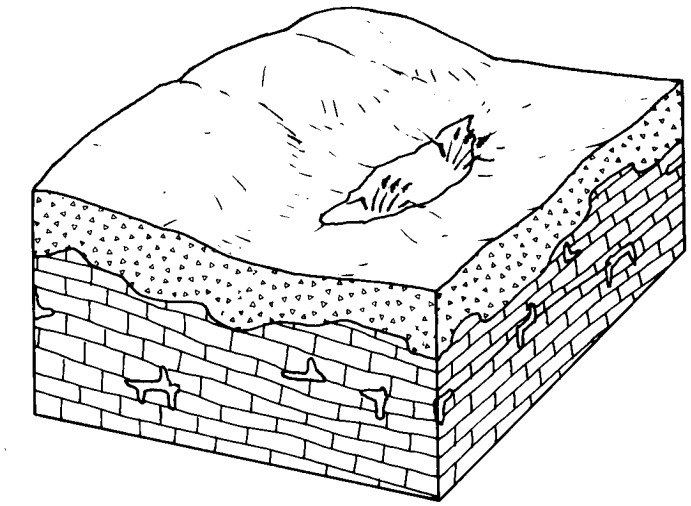
7Aa Till Over Bedded Sedimentary Rock

This hydrogeologic setting is characterized by moderate relief and flat-lying, fractured sedimentary rock. The underlying bedrock consists of thick sequences of Ordovician shale interbedded with thin layers of limestone. These sedimentary rock units are covered by varying thicknesses of glacial till. The till layer consists of unsorted deposits of interbedded clay, silt, and sand. Although ground water occurs in both the glacial deposits and the fractured bedrock, bedrock is the principal aquifer. The main source of recharge to the bedrock aquifer is from the overlying glacial till. This recharge is low to moderate due to the impermeable nature of the till and soils. Soils are clay loam. Depth to water varies, depending on glacial till thickness, but measures between 50–75 feet.

The GWPP index values for the hydrogeologic setting of Till Over Bedded Sedimentary Rock are 60 and 75 with the total number of GWPP index calculations equaling 2.

Setting: 7Aa1		**GENERAL**		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	0-2	4	1	4
Aquifer Media	Limestone and Shale	3	3	9
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	1-100	3	1	3
		GWPP	INDEX	60

Setting: 7Aa2		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone and Shale	3	3	9
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	1-100	3	1	3
		GWPP	INDEX	75



7Ac Glacial Till Over Limestone

This hydrogeologic setting is characterized by flat to rolling topography and limestone bedrock covered by varying thicknesses of glacial till. The till consists primarily of clay with varying amounts of silt, sand, and gravel. Sand and gravel lenses within the till are numerous but are too thin to constitute an aquifer. The limestone bedrock serves as the aquifer in this setting. Ground water occurs in fractures and solution channels within the formation. The limestone is in direct hydraulic connection with the glacial till, and precipitation infiltrating through the till serves as a source of recharge for the underlying limestone. Depth to water is extremely variable, depending in part on the thickness of the glacial till. Soils are typically clay loam and depth to water generally ranges from 20 to 50 feet.

The GWPP index values for the hydrogeologic setting of Glacial Till Over Limestone range from 76 to 144 with the total number of GWPP index calculations equaling 23.

Setting: 7Ac1		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	9	9
Impact of Vadose Zone	Till	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	102

Setting: 7Ac2		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	115

Setting: 7Ac3		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	82

Setting: 7Ac4		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	76

Setting: 7Ac5		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	87

Setting: 7Ac6		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	102

Setting: 7Ac7		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	88

Setting: 7Ac8		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	106

Setting: 7Ac9		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	81

Setting: 7Ac10		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	88

Setting: 7Ac11		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	136

Setting: 7Ac12		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	108

Setting: 7Ac13				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	115

Setting: 7Ac14				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	144

Setting: 7Ac15				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Limestone and Shale	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	91

Setting: 7Ac16				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP		96

Setting: 7Ac17				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	103

Setting: 7Ac18				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	136

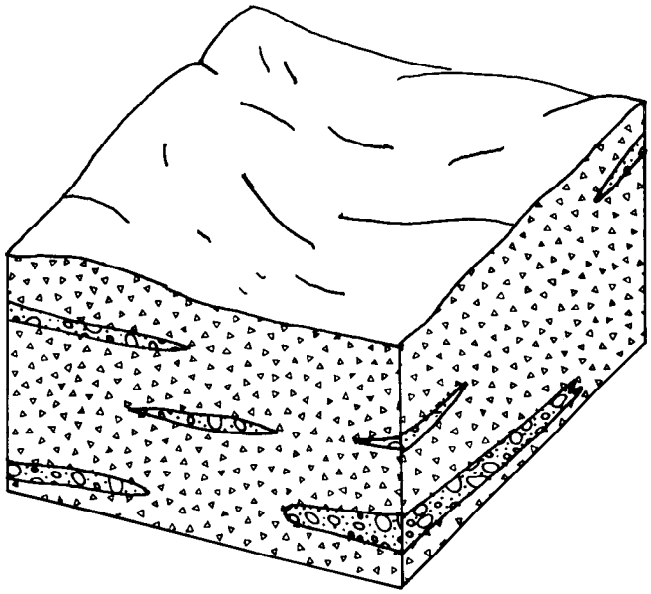
Setting: 7Ac19				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	125

Setting: 7Ac20				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	135

Setting: 7Ac21				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	96

Setting: 7Ac22				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	96

Setting: 7Ac23				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	86



7Af Sand and Gravel Interbedded in Glacial Till

This hydrogeologic setting is characterized by low to moderate relief and sand and gravel deposits interbedded in glacial till. The till is composed primarily of clay with varying amounts of unsorted silt, sand, and gravel. The sand and gravel may be relatively thin and discontinuous, lens-shaped bodies, or thick layers which cover a large area. The thick units are usually confined to common horizons within the till. Ground water occurs in both the till and the sand and gravel; however, the sand and gravel serves as the principal aquifer. Recharge to the sand and gravel is primarily due to infiltration of precipitation through the till. Depth to water is highly variable, but on average ranges from 30 to 50 feet. Soils are typically described as clay loams.

The GWPP index values for the hydrogeologic setting of Sand and Gravel Interbedded in Glacial Till range from 75 to 156 with the total number of GWPP index calculations equaling 70.

Setting: 7Af1			**GENERAL**	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	140

Setting: 7Af2		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	123

Setting: 7Af3		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	118

Setting: 7Af4		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	100-300	3	2	6
		GWPP	INDEX	131

Setting: 7Af5		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	100-300	3	2	6
		GWPP	INDEX	116

Setting: 7Af6				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	100-300	3	2	6
		GWPP	INDEX	110

Setting: 7Af7				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	117

Setting: 7Af8				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sand	2	9	18
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	118

Setting: 7Af9				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	106

Setting: 7Af10				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	98

Setting: 7Af11				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	90

Setting: 7Af12				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	116

Setting: 7Af13				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
	700-1000	3	6	18
		GWPP	INDEX	107

Setting: 7Af14				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	93

Setting: 7Af15				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	126

Setting: 7Af16				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	112

Setting: 7Af17				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	107

Setting: 7Af18				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	143

Setting: 7Af19				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	134

Setting: 7Af20				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	139

Setting: 7Af21				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	93

Setting: 7Af22				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	100

Setting: 7Af23				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	0-2	4	1	4
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	91

Setting: 7Af24				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	18+%	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	91

Setting: 7Af25				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	99

Setting: 7Af26				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	89

Setting: 7Af27				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	83

Setting: 7Af28				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	75

Setting: 7Af29				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	80

Setting: 7Af30				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	134

Setting: 7Af31				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	90

Setting: 7Af32				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	105

Setting: 7Af33				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	110

Setting: 7Af34				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	148

Setting: 7Af35				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	147

Setting: 7Af36				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	126

Setting: 7Af37				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	121

Setting: 7Af38				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	116

Setting: 7Af39				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	119

Setting: 7Af40				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-5	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	136

Setting: 7Af41				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	116

Setting: 7Af42				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	121

Setting: 7Af43				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	135

Setting: 7Af44				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	125

Setting: 7Af45				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	124

Setting: 7Af46				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	96

Setting: 7Af47				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	102

Setting: 7Af48				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	83

Setting: 7Af49				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	140

Setting: 7Af50				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	134

Setting: 7Af51				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	156

Setting: 7Af52				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	95

Setting: 7Af53				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	131

Setting: 7Af54				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	131

Setting: 7Af55				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	88

Setting: 7Af56				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	111

Setting: 7Af57				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	95

Setting: 7Af58				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	136

Setting: 7Af59				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Shrink/Swell Clay	2	7	14
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	133

Setting: 7Af60				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	102

Setting: 7Af61				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	121

Setting: 7Af62				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	120

Setting: 7Af63				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	93

Setting: 7Af64				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	109

Setting: 7Af65				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	107

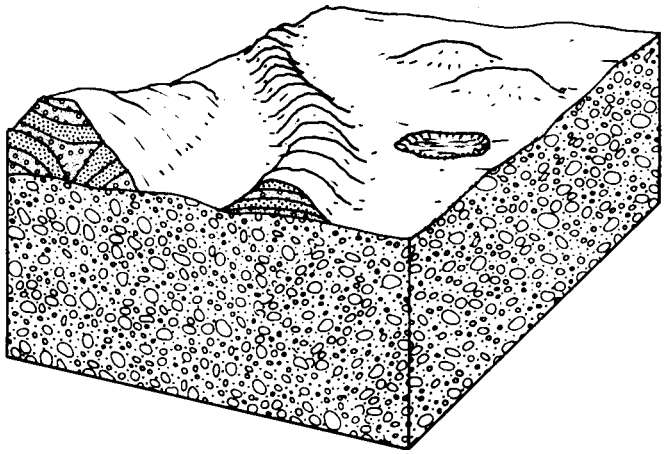
Setting: 7Af66				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	117

Setting: 7Af67				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	124

Setting: 7Af68				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	122

Setting: 7Af69				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Shrink/Swell Clay	2	7	14
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	142

Setting: 7Af70		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	140



7Ba Outwash

This hydrogeologic setting is characterized by moderate topography and varying thicknesses of outwash. This setting includes both outwash plains and terraces. Kames are also included in this setting. The outwash consists of water-washed deposits of sand and gravel which serve as the principal aquifer. Soils are typically sandy loam and permeable. Recharge to the sand and gravel is relatively high. The outwash also serves as a source of recharge to the underlying bedrock. Depth to water is generally less than 30 feet.

The GWPP index values for the hydrogeologic setting of Outwash range from 112 to 200 with the total number of GWPP index calculations equaling 29.

Setting: 7Ba1		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	182

Setting: 7Ba2		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	186

Setting: 7Ba3		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	171

Setting: 7Ba4		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	1000+	3	10	30
		GWPP	INDEX	200

Setting: 7Ba5		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	158

Setting: 7Ba6		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	162

Setting: 7Ba7		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	168

Setting: 7Ba8		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	172

Setting: 7Ba9		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Shrink/Swell Clay	2	7	14
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	120

Setting: 7Ba10		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Silt and Clay	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	118

Setting: 7Ba11		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Silt and Clay	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	112

Setting: 7Ba12		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	129

Setting: 7Ba13				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	135

Setting: 7Ba14				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	157

Setting: 7Ba15				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	148

Setting: 7Ba16				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silty Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	144

Setting: 7Ba17				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	167

Setting: 7Ba18				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	150

Setting: 7Ba19				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	143

Setting: 7Ba20				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	178

Setting: 7Ba21		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	182

Setting: 7Ba22		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	166

Setting: 7Ba23		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	0-5	5	10	50
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sand	2	9	18
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	193

Setting: 7Ba24		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	6	18
		GWPP	INDEX	138

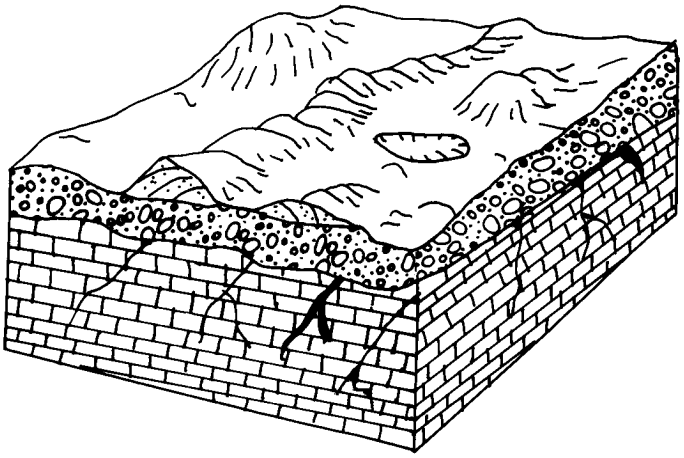
Setting: 7Ba25				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	196

Setting: 7Ba26				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	186

Setting: 7Ba27				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	154

Setting: 7Ba28				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	134

Setting: 7Ba29		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sand	2	9	18
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	156

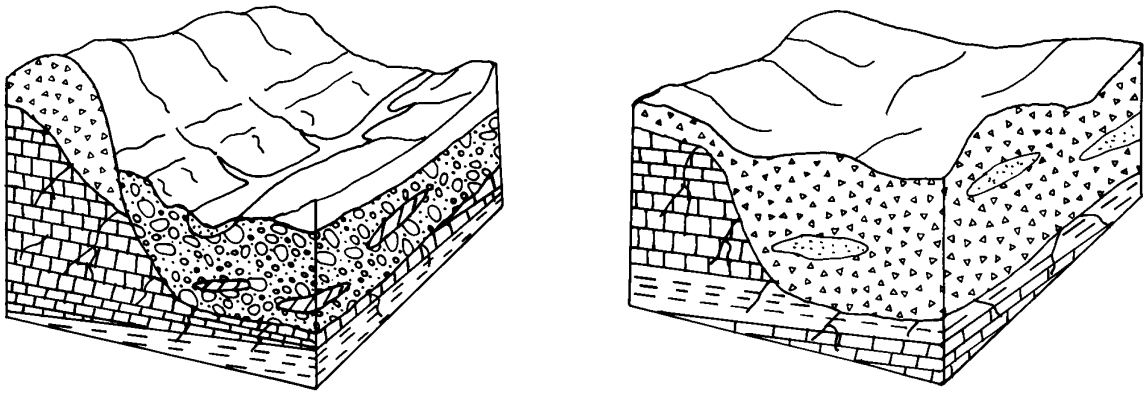


7Bc Outwash Over Limestone

This setting is characterized by limestone covered by outwash deposits. Topography varies from relatively flat to gently rolling. The outwash of this setting consists primarily of sand and gravel containing minor till, silt, or clay. The outwash is typically found in terraces or kames. The outwash is too thin to comprise the aquifer, therefore ground water is obtained from the underlying limestone bedrock. Depth to water is typically under 30 feet. Soils are usually loams or sandy loams. The limestone is described in the 7Ac setting. Recharge is moderate to high due to the permeable nature of the soils and vadose, the relatively shallow depth to water, flat-lying topography, and the close proximity of the bedrock to the ground surface.

The GWPP index value for the hydrogeologic setting Outwash over Lime-stone is 154 with the total number of GWPP index calculations equaling 1.

Setting: 7Bc1		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Clay	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	154



(a) (b)

7D Buried Valley

This hydrogeologic setting varied considerably across Champaign County. The buried valleys were created by pre-glacial or interglacial rivers which downcut deeply into the bedrock. The differing glacial deposits filling these valleys can be best illustrated by describing the two common forms or types mapped within Champaign County.

One common form of buried valley deposits (Block Diagram a) is best exemplified by the Mad River Valley. The valley is occupied by a modern river and floodplain containing abundant outwash and kame deposits, and is easy to distinguish from the surrounding till and bedrock uplands. The depth to water is usually less than 30 feet. The upper portion of the valley commonly contains 50 to 100 feet of sand and gravel outwash with minor till or fine lacustrine deposits. Yields over 500 gpm are possible from properly constructed wells. Soils are typically loams or sandy loams. The streams are usually in direct hydraulic connection with the aquifer. Recharge is typically high.

The other common form of buried valley (Block Diagram b) is best exemplified by the Teays Valley in far western Champaign County. These valleys are typically overlain by end moraines, and the rolling topography makes it difficult to distinguish the valleys from surrounding areas. They contain either intermittent streams or no streams at all. The aquifer consists of thin lenses of sand and gravel interbedded in very thick sequences of fine-grained till and lacustrine deposits. Yields are commonly less than 25 gpm. Soils are typically clay loams. Depth to water is typically greater than 50 feet. Recharge is generally moderate to low. GWPP index values for these settings are usually less than 120 and are often less than 100.

The GWPP index values for the hydrogeologic setting Buried Valleys range from 70 to 204 with the total number of GWPP index calculations equaling 139.

Setting: 7D1				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	112

Setting: 7D2				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	144

Setting: 7D3				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	0-5	5	10	50
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Silt and Clay	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	159

Setting: 7D4				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	107

Setting: 7D5		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sand	2	9	18
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	122

Setting: 7D6		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	128

Setting: 7D7		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	123

Setting: 7D8		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	144

Setting: 7D9				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	133

Setting: 7D10				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	143

Setting: 7D11				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	156

Setting: 7D12				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	18+%	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	131

Setting: 7D13				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	133

Setting: 7D14				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sand	2	9	18
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	135

Setting: 7D15				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	115

Setting: 7D16				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	135

Setting: 7D17				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	129

Setting: 7D18				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	125

Setting: 7D19				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	130

Setting: 7D20				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	142

Setting: 7D21				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	140

Setting: 7D22				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	100-300	3	2	6
		GWPP	INDEX	131

Setting: 7D23				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	137

Setting: 7D24				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	138

Setting: 7D25				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	102

Setting: 7D26				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	110

Setting: 7D27				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	108

Setting: 7D28				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	200

Setting: 7D29				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	204

Setting: 7D30				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	182

Setting: 7D31				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	107

Setting: 7D32				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	135

Setting: 7D33				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	118

Setting: 7D34				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	139

Setting: 7D35				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	127

Setting: 7D36				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	139

Setting: 7D37				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	117

Setting: 7D38				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	156

Setting: 7D39				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	171

Setting: 7D40				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	154

Setting: 7D41				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	149

Setting: 7D42				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	128

Setting: 7D43				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	137

Setting: 7D44				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	125

Setting: 7D45				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	135

Setting: 7D46				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	90

Setting: 7D47				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	85

Setting: 7D48				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	80

Setting: 7D49				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	99

Setting: 7D50				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	75

Setting: 7D51				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	156

Setting: 7D52				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	95

Setting: 7D53				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	164

Setting: 7D54				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	132

Setting: 7D55				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	73

Setting: 7D56				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	148

Setting: 7D57				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	135

Setting: 7D58				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	129

Setting: 7D59				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	102

Setting: 7D60				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	98

Setting: 7D61				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	134

Setting: 7D62				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	181

Setting: 7D63				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	107

Setting: 7D64				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Peat	2	8	16
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	185

Setting: 7D65				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	118

Setting: 7D66				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	171

Setting: 7D67				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Peat	2	8	16
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	175

Setting: 7D68				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	141

Setting: 7D69				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	140

Setting: 7D70				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	134

Setting: 7D71				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	115

Setting: 7D72				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	141

Setting: 7D73				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	136

Setting: 7D74				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	105

Setting: 7D75				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Peat	2	8	16
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	134

Setting: 7D76				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	83

Setting: 7D77				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	79

Setting: 7D78				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	137

Setting: 7D79				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	133

Setting: 7D80				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	119

Setting: 7D81				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	89

Setting: 7D82				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	121

Setting: 7D83				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	116

Setting: 7D84				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	129

Setting: 7D85				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	134

Setting: 7D86				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	160

Setting: 7D87				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	111

Setting: 7D88				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	139

Setting: 7D89				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	80

Setting: 7D90				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	172

Setting: 7D91				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	166

Setting: 7D92				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	158

Setting: 7D93				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	138

Setting: 7D94				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silty Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	168

Setting: 7D95				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	172

Setting: 7D96				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	121

Setting: 7D97				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	99

Setting: 7D98				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silty Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	178

Setting: 7D99				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	186

Setting: 7D100				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	177

Setting: 7D101		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	171

Setting: 7D102		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	168

Setting: 7D103		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	162

Setting: 7D104		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	139

Setting: 7D105		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	139

Setting: 7D106		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	136

Setting: 7D107		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	138

Setting: 7D108		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	156

Setting: 7D109				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	143

Setting: 7D110				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	89

Setting: 7D111				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	196

Setting: 7D112				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	88

Setting: 7D113				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	96

Setting: 7D114				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	86

Setting: 7D115				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	88

Setting: 7D116				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	93

Setting: 7D117				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	160

Setting: 7D118				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silty Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	157

Setting: 7D119				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	161

Setting: 7D120				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	128

Setting: 7D121		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	133

Setting: 7D122		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	144

Setting: 7D123		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	124

Setting: 7D124		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	0-5	5	10	50
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	150

Setting: 7D125				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	145

Setting: 7D126				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	88

Setting: 7D127				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	120

Setting: 7D128				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	93

Setting: 7D129				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	91

Setting: 7D130				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	0-2	4	1	4
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	3	15
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	70

Setting: 7D131				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	0-2	4	1	4
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	3	15
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	75

Setting: 7D132				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	3	15
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	91

Setting: 7D133			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	130

Setting: 7D134			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Shrink/Swell Clay	2	7	14
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	138

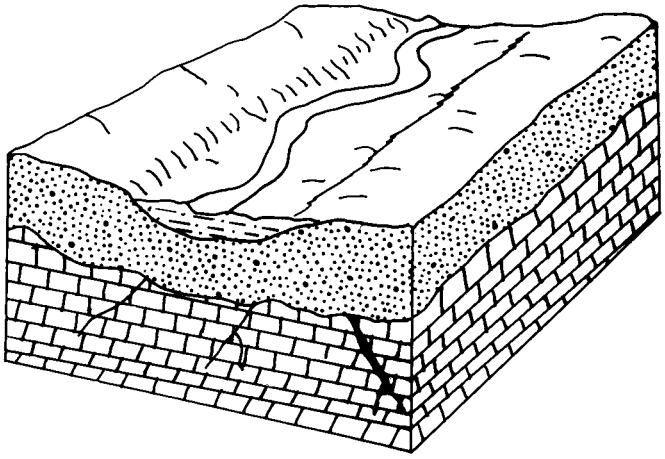
Setting: 7D135			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	106

Setting: 7D136			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	162

Setting: 7D137			**GENERAL**	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	128

Setting: 7D138			**GENERAL**	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	114

Setting: 7D139			**GENERAL**	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-3000	3	8	24
		GWPP	INDEX	149



7Ec Alluvium Over Sedimentary Rock

This hydrogeologic setting is characterized by low relief with thin to moderate thicknesses of modern, stream-deposited alluvium. The alluvium is composed of silt, sand, clay, and minor gravel. Depth to water is shallow, and the stream is usually in hydraulic connection with the alluvial deposits. The alluvial deposits are underlain by limestone. These rocks are described in the 7Ac setting. The underlying fractured limestone serves as the aquifer in this setting. The alluvial deposits serve as a source of recharge to the limestone. Soils are variable. Recharge is moderate to high due to the shallow depth to water, flat topography, and the moderately permeable nature of the alluvium.

The GWPP index values for the hydrogeologic setting Alluvium Over Sedimentary Rock range from 132 to 150 with the total number of GWPP calculations equaling 5.

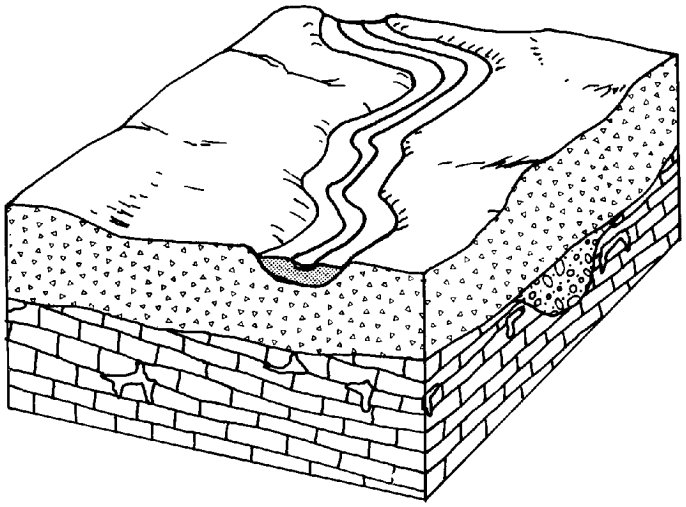
Setting: 7Ec1		**GENERAL**		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Silty Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	150

Setting: 7Ec2				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Silty Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	145

Setting: 7Ec3				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Silty Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	132

Setting: 7Ec4				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Silty Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	146

Setting: 7Ec5				**GENERAL**
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	136



7Ed Alluvium Over Glacial Till

This hydrogeologic setting is characterized by flat-lying topography with surficial deposits of present-day, stream-deposited alluvium confined to modern floodplains in upland areas. The alluvium is composed of silt, sand, gravel, and clay that is deposited directly over the glacial till. Sand and gravel lenses within the till serve as the aquifer in this hydrogeologic setting. Depth to water is typically shallow and the overlying stream is usually in hydraulic contact with the aquifer material. The underlying till is described in setting 7Af. Soils are typically loams or silt loams.

The GWPP index values for the hydrogeologic setting of Alluvium Over Glacial Till range from 131 to 186 with the total number of GWPP index calculations equaling 13.

Setting: 7Ed1		**GENERAL**		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	151

Setting: 7Ed2		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Shrink/Swell	2	7	14
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	157

Setting: 7Ed3		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	141

Setting: 7Ed4		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	135

Setting: 7Ed5		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Silt and Clay	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	142

Setting: 7Ed6				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	142

Setting: 7Ed7				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	131

Setting: 7Ed8				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	136

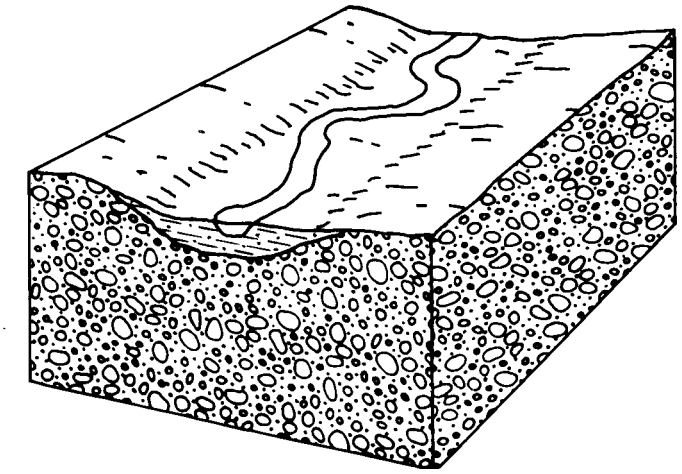
Setting: 7Ed9				GENERAL
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	131

Setting: 7Ed10		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	165

Setting: 7Ed11		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	154

Setting: 7Ed12		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	132

Setting: 7Ed13		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	186



7Ee - Alluvium Over Outwash

This hydrogeologic setting is characterized by low relief with thin to moderate thicknesses of modern, stream-deposited alluvium overlying outwash. The alluvium is composed of silt, sand, gravel, and clay. The underlying outwash serves as the aquifer. The depth to the water table is shallow and the stream may be in hydraulic connection with the alluvial deposits. Soils are typically silty or sandy loams. The underlying outwash is described in setting 7Ba. The alluvial deposits serve as a source of recharge for the outwash. Recharge is high.

The GWPP index value for the hydrogeologic setting of Alluvium Over Outwash is 178 with the total number of GWPP index calculations equaling 1.

Setting: 7Ee1		**GENERAL**		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	178

Ground Water Pollution Potential of CHAMPAIGN COUNTY

by

Wayne Jones

1 0 1 2 Miles

1 0 1 2 Kilometers

CONTOUR INTERVAL 10 FEET

County Line

Township Line

Incorporated City Limit

N

Hydrogeologic Settings

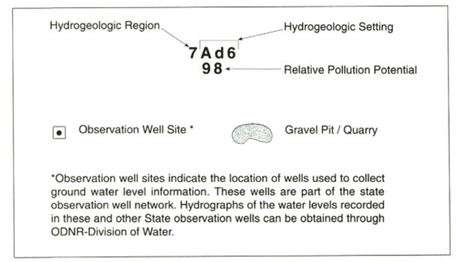
- 7Aa – Glacial Till Over Bedded Sedimentary Rock
- 7Ac – Glacial Till Over Limestone
- 7Af – Sand & Gravel Interbedded in Glacial Till
- 7Ba – Outwash
- 7Bc – Outwash Over Limestone
- 7D – Buried Valley
- 7Ec – Alluvium Over Bedded Sedimentary Rock
- 7Ed – Alluvium Over Glacial Till
- 7Ee – Alluvium Over Outwash

A more detailed description of the hydrogeologic settings and the evaluation of the pollution potential may be found in the publication "Ground Water Pollution Potential of Champaign County", GWPP Report No. 39, Ohio Department of Natural Resources, Division of Water.

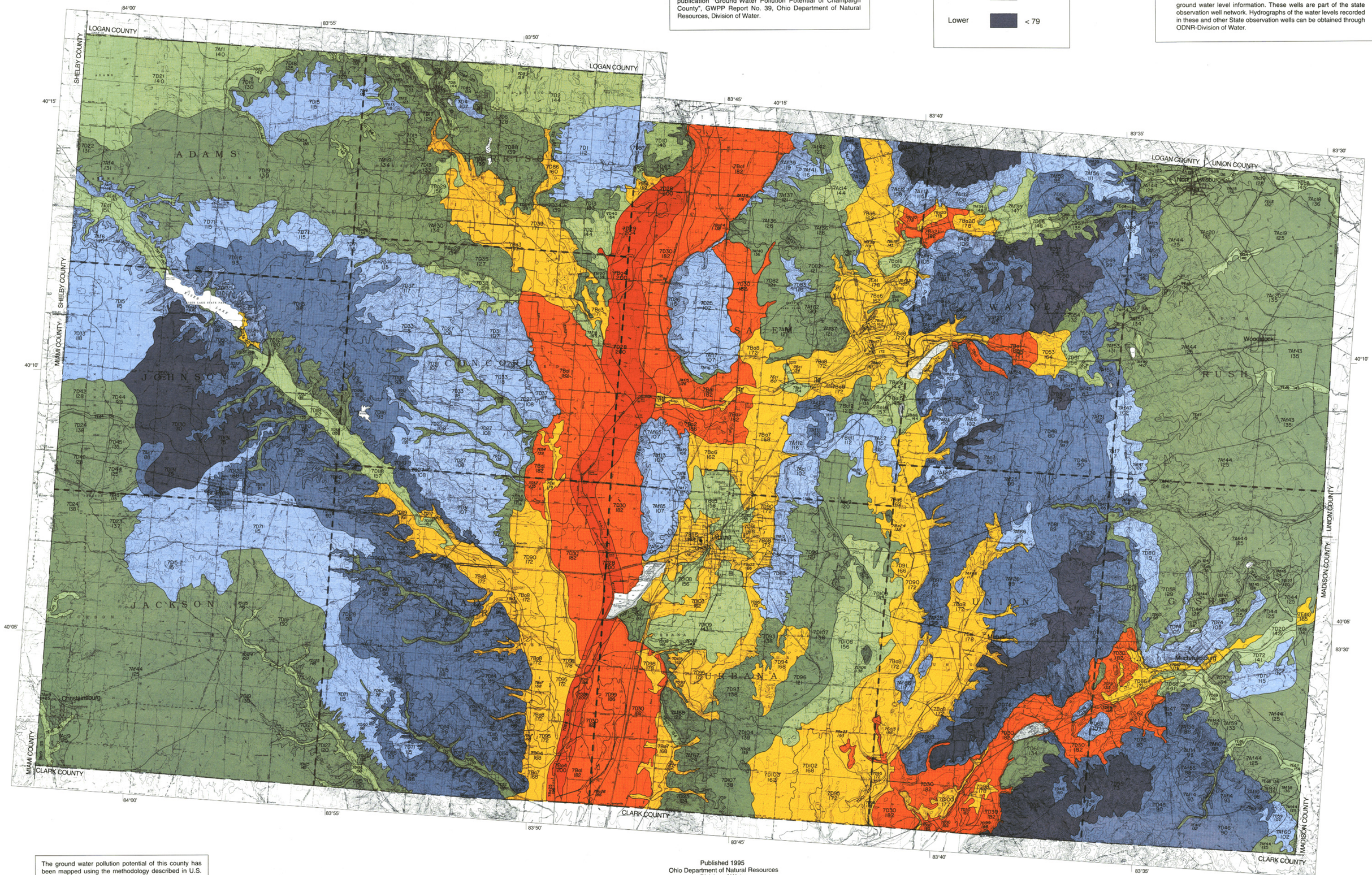
Pollution Potential Index Range

Higher	200+
	180 - 199
	160 - 179
	140 - 159
to	120 - 139
	100 - 119
	80 - 99
Lower	< 79

Description of Map Symbols



*Observation well sites indicate the location of wells used to collect ground water level information. These wells are part of the state observation well network. Hydrographs of the water levels recorded in these and other State observation wells can be obtained through ODNR-Division of Water.



The ground water pollution potential of this county has been mapped using the methodology described in U.S. EPA Publication EPA/600-2-87/035, "DRASTIC: A Standardized System for Evaluating Ground Water Pollution Potential Using Hydrogeologic Settings" (Aller et al., 1987).

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