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Genesee/Finger Lakes Wellhead Protection Study

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I. Varysburg Study Area

List of Tables and Maps

Table 2i: Study Area Contaminants

Table 3i: Potential Sources of Contamination

Map 2.2: Study Area Locations

Map 3i: Bedrock Geology*

Map 4i: Surficial Geology*

Map 5i: Aquifers*

Map 10i: Shallow Depth to Bedrock and Groundwater*

Map 11i: Areas of Pollution Hazard Due to Soil Permeability*

Map 12i: Wetlands and Hydric Soils*

Map 13i: Land Use*

Map 15i: Potential Contaminants Inventory*

* Map Legends are in Appendix G

1. Source of Drinking Water

System Information

The Varysburg Water District water system has 100 service connections and a service population of 310 with one commercial customer and one industrial customer. All service connections are metered. Average daily water production was 24,000 gallons per day in 1996 and in 1997. This demand is expected to remain constant through 2020. The supply has enough capacity to satisfy the system's anticipated growth in demand. Recently prepared population projections indicate that the Town of Sheldon's population is expected to remain relatively constant with less than two percent growth each decade between the years 2000 and 2020.

Water consumption figures seem to confirm adequate system integrity and minimum leakage (80-90% consumption) and the reservoir appeared to be in good condition during the last inspection by the County Health Department.

Water Supply Information

This water system is supplied by two wells located off Route 98 at the corner of School Street in the Town of Sheldon (see Map 2.2). Well No. 1, the primary source, is 100 feet deep and the pump has a "strainer." The depth and characteristics of well No. 2 are unknown. No well logs are available. The wells provides approximately 24,000 gallons per day. With an approved capacity of 48,000 gallons per day each, the system production capacity is estimated at 100,000 gallons per day.

Source of Groundwater

The bedrock geology in Wyoming County consists of sedimentary shales, sandstones, and siltstone formed during the Devonian period of the Paleozoic era. The wells are located over Onondaga Limestone and Tristates Group of Onondaga Limestone (Refer to Map 3i, Bedrock Geology.) Water supplies located in this bedrock formation often contain a higher level of sulfides.

The Varysburg wells are located within an area of lacustrine silt and clay that was deposited in proglacial lakes and which is characterized as being generally calcareous, with low permeability, potential land instability, and variable thickness of up to 50 meters. (Refer to Map 4i, Surficial Geology.)

The Varysburg wells are located in an area that has been defined as having an confined aquifer with potential well yields of 5 to more than 500 gallons per minute (see Map 5i, Aquifers). This type of aquifer is described as sand and gravel overlain by till, very fine sand, silt, or clay, but without a surficial aquifer. In a confined aquifer, the aquifer is separated from the surface by a protective impermeable layer of material.

Surrounding Land Uses

This water system is supplied by two wells located off Route 98 at the corner of School Street in the Town of Sheldon and the land immediately surrounding the well is owned by the Town. The land area that contributes to the well is depicted on Map 13i and is primarily rural in nature. The general land use in the project area primarily includes forested land and agricultural land used for dairy and beef operations, field crops, and pasture. Residences are concentrated in the Hamlet of Varysburg which is located on Route 20A, in the Hamlet of Johnsonburg (Route 98 and Centerline Road), and along Routes 98 and 20A. Commercial establishments, industrial uses and community services are also concentrated in the Hamlets of Varysburg and Johnsonburg.

2. Water Quality and Water Treatment Information

The water withdrawn from the well and the springs is disinfected by chlorination. This supply is tested for bacteria every month and the raw water sampling in 1998 included testing pesticides, volatile organics (VOCs), and inorganics. Volatile organic chemical sampling performed in 1994 and 1995 indicated a low level presence of chloromethane; raw water sampling was conducted to assist in tracking a potential source of the contamination which is assumed to be pump grease. Water quality testing performed in 1998 by the County Health Department and the water supplier indicated very low levels of VOCs; otherwise, all the results were in compliance with New York State Department of Health (DOH) Sanitary Code Regulations.

3. Evaluation of Potential Source of Contamination and Susceptibility

The County Health department has indicated no potential contamination concerns associated with this supply. This assessment evaluates the contaminants that may enter the water drawn directly from the wells and springs. Each significant potential source of contamination has been analyzed and prioritized (low, medium, and high) in accordance to their potential to impact the water supply in Table 2i. Map 15i shows potential sources of contamination within the study area. A listing of the site-specific sources, which is keyed to Map 15i is given in Table 3i. A description of the significant potential sources of contamination and susceptibility associated with the Inner and Outer (Study Area) Well Zones is provided below.

Agricultural Sources

The agricultural uses in the study area include dairy livestock and products; cattle and calves; and field crops. Potential sources of contamination from these uses include animal feedlots and burial areas, manure spreading areas and storage pits, livestock waste disposal areas, chemical storage areas and containers, farm machinery areas, crop areas, and agricultural drainage tiles. Agricultural contaminants linked to these sources include livestock sewage wastes; nitrates; phosphates; chloride; chemical sprays and dips for controlling insect, bacterial, viral, and fungal pests on livestock; coliform and noncoliform bacteria; viruses; pesticides; fertilizers; gasoline and motor oils from chemical applicators; automotive wastes; and welding wastes. Coliform bacteria can indicate the presence of pathogenic (disease-causing) microorganisms that may be transmitted in human feces. Diseases such as typhoid fever, hepatitis, diarrhea, and dysentery can result from sewage contamination of water supplies. Pesticides include herbicides, insecticides, rodenticides, fungicides, and avicides. EPA has registered approximately 50,000 different pesticide products for use in the United States. Many are highly toxic and quite mobile in the subsurface. An EPA survey found the most common pesticides found in drinking water wells were DCPA (dacthal) and atrazine, which EPA classifies as moderately toxic and slightly toxic materials, respectively. The EPA National Pesticide Survey found that the use of fertilizers correlates to nitrate contamination of ground water supplies. No quality problems have been detected in the drinking water supply with respect to nitrates. Automotive wastes can include gasoline, antifreeze, automotive transmission fluid, battery acid, engine and radiator flushes, engine and metal degreasers, hydraulic fluid, and motor oils.

Residential Sources

There are approximately 185 residences in the study area which are concentrated in the Hamlet of Varysburg which is located on Route 20A, and the Hamlet of Johnsonburg (Route 98 and Centerline Road) along Routes 98 and 20A.

Potential sources of residential contamination include septic systems, cesspools, common household maintenance and hobbies, lawns and gardens, swimming pools, and underground storage tanks.

A large number (about 17) are located in the Hamlet of Varysburg within the inner well zone. These potential sources of contamination are of concern. Although the soils in the inner well zone are classified as having a high hazard of pollution from septic systems and also a high surface penetration hazard (see Map 1 Ii, Areas of Pollution Hazard Due to Soil Permeability), this is mitigated by the location of the wells in an area that has been defined as having a confined aquifer (see Map 5i, Aquifers). In a confined aquifer, the aquifer is separated from the surface by a protective impermeable layer of material.

Municipal Sources

Municipal sources of contamination include schools and government offices and grounds; park lands; highways, road maintenance depots, and deicing storage and operations; municipal sewage treatment plants and sewer lines; storm water drains and basins, combined sewer overflows, and municipal waste landfills, dumps, and junkyards.

The study area includes the Camp Wyomoco (4H) which is considered parkland as well as a campground; however the primary potential municipal source of contamination in this area are roadways (and associated storm water runoff and drainage). Park lands use fertilizers; herbicides; and insecticides. Highways maintenance operations include the use of herbicides in highway rights-of-way; road salt (sodium and calcium chloride); road salt anticaking additives (ferric ferrocyanide, sodium ferrocyanide); road salt anticorrosives (phosphate and chromate); and automotive wastes. Contaminant data regarding road deicing and salt storage can be found in Appendix B1. Stormwater runoff and drainage structures involve the following potential contaminants: gasoline oil; other petroleum products; road salt; and microbiological contaminants.

Commercial Sources

A variety of commercial uses that are potential sources of contamination are located in the study and are concentrated primarily within the Hamlets of Varysburg and Johnsonburg. These potential commercial sources include the following: apartments, restaurants, auto repair, a gas station, a storage building or warehouse, a commercial agricultural operation, Camp Wyomoco, three cemeteries, and retail services. However, the primary potential commercial sources of contamination in this area are the gas station located on 20A about 3500 feet from the wells.

Auto repair shops may involve oils; waste oils; solvents; acids; paints; miscellaneous wastes; and gasoline storage. Gasoline service stations account for waste oils; solvents; acids; paints; automotive wastes; and miscellaneous cutting oils. Many have underground storage tanks. Above-ground and underground storage tanks contain and can leak heating oil; diesel fuel; gasoline; other petroleum products; and other commercially used chemicals. Storage, warehouse, and distribution facilities may involve the storage of materials that contain contaminants of concern and may involve automotive wastes from the vehicles serving the facility. Commercial agricultural business account for herbicides; insecticides; fungicides; and other pesticides. Camp grounds account for septage; gasoline; diesel fuel; pesticides; and household hazardous wastes. Cemeteries account for leachate and lawn and garden maintenance chemicals.

The study area includes about five retail services located within the study area; most of these are located within the Village of Hamlet of Varysburg on 20A within 1000 feet of the wells. Retail services that could be located in this area and that are of concern include: barber and beauty shops, car dealerships, car washes, carpet stores, construction trade areas and materials, dry cleaners, furniture repair and finishing shops, jewelry/metal plating shops, laundromats, paint shops, pharmacies, photography shops and photo processing laboratories, print shops, and sports and hobby shops. Refer to Appendix C for a list of the contaminants of concern associated with each of these retail uses.

Industrial Sources

Industrial sources of contamination include manufacturing and processing; mining operations; oil, gas, salt and solution wells; injection wells; major oil storage facilities; hazardous waste sites; public utilities, and petroleum and

chemical bulk storage sites. A limited amount of industrial activity is located in the study area and includes: one dry wildcat wells, a public utilities (New York Telephone), and two petroleum bulk storage sites. The primary potential industrial source of contamination in this area are the two petroleum bulk storage site located on 20A; the closest site is 1000 feet from the wells. Petroleum bulk storage sites have the potential for contaminating groundwater with VOCs.

4. Ongoing Watershed Protection Activities

Watershed Rules and Regulations are in effect for this system. As part of the Wyoming County Soil and Water Conservation District's effort to encourage the use of Best Management Practices (BMPs), three dairy farms in the study area have been reviewed and appropriate BMP have been identified and installed. These BMPs include the installation of barnyard runoff control, silage leachate collection, milking center waste waste system, a waste utilization plan, and manure storage at the Boxler dairy farm located within the study area. At the Clakins dairy farm, the BMPs include a nutrient management plan and manure storage. Barnyard runoff management, silage leachate control, and a nutrient management plan have been identified as needed at the Roesch dairy farm.

There are many other county programs for source water/ground water and watershed protection currently underway. For a listing of county programs contact Genesee County using the information given in the Additional Information Section of this report. The Genesee/Finger Lakes Regional Planning Council coordinates a semi-annual Regional Planning & Zoning Workshop two times per year. The primary audience for the workshops is municipal boards and enforcement officers. The program includes sessions on water quality protection and a groundwater pollution prevention demonstration.

5. Source Water Protection Needs

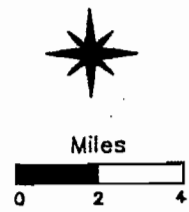
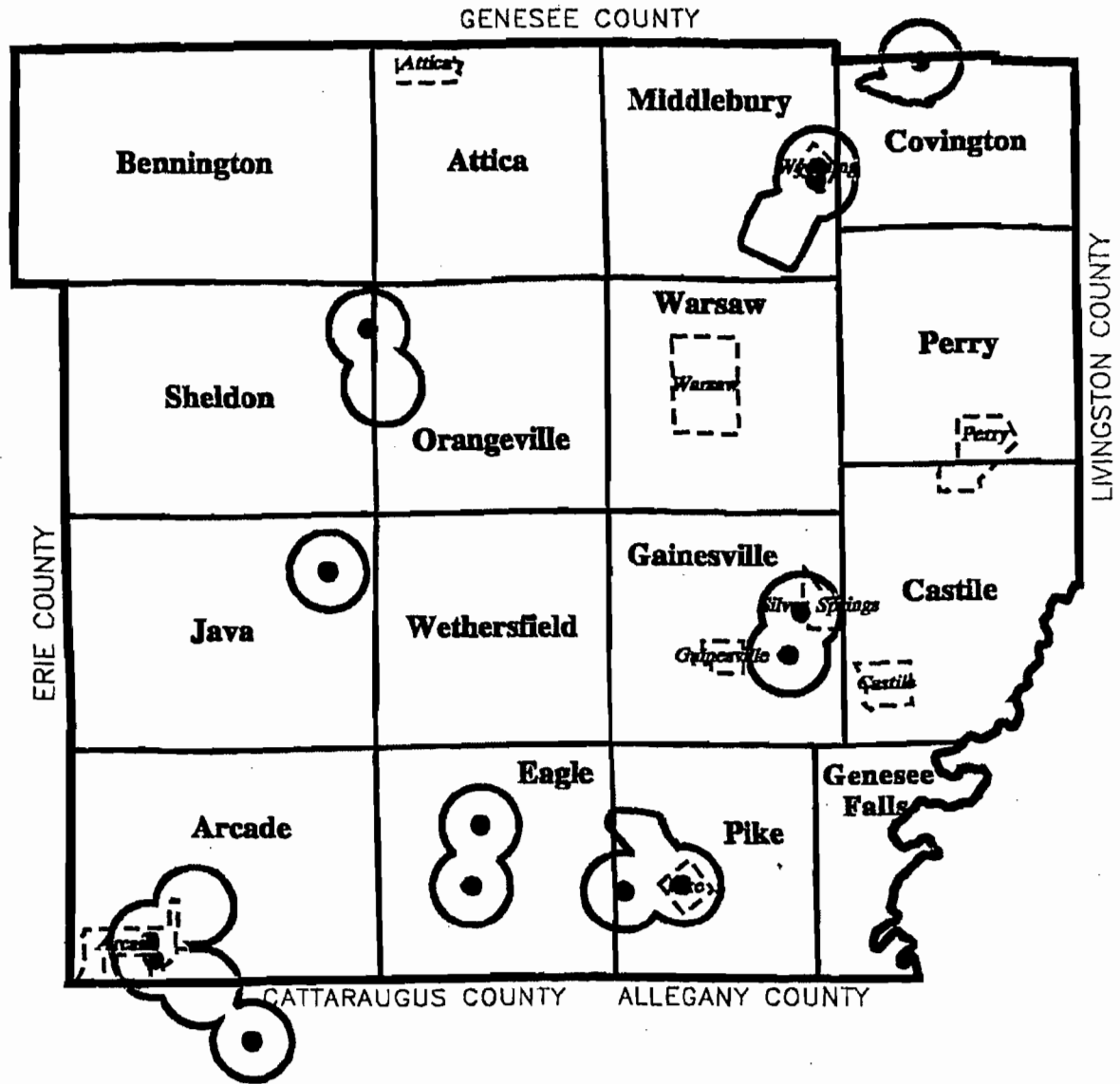
The County Health department has indicated no potential contamination concerns associated with this supply. However, the Town should consider developing an aquifer protection program for the wells. For example, the protection program may include: the adoption of updated Watershed Rules and Regulations; the distribution of educational materials to property owners with respect to fertilizer application, household chemical storage, use, and disposal, and septic system maintenance; the identification of appropriate Agricultural Best Management Practices (BMPs) and the encouragement of their use on adjacent farm operations; and the evaluation of septic systems.

6. Additional Information

Additional information based on this report can be supplied through the Genesee/Finger Lakes Regional Planning Council, 1427 Monroe Avenue, Rochester, New York 14618. The telephone number is 716-442-3770. The Internet web site address is www.gflrpc.org. For specific information regarding Wyoming County use the following contact information: Wyoming County Economic Development & Planning, 200 Allen Street, Warsaw, NY 14569, 716-786-8846

Study Area Locations

Wyoming County, New York



Source: Wyoming County Economic Development and Planning Department, 1998.
TIGER/Line File, US Dept of Commerce, Bureau of Census, 1992 & 1994
Prepared by Genesee/Finger Lakes Regional Planning Council 12/98.

Table 2i
Study Area Contaminants
Varysburg Study Area

Potential Sources of Contamination	Contaminants of Concern	Description	Potential Impact to Water Supply
Agricultural Activities	Nitrates; phosphates; chloride; pathogens including cryptosporidium, protozoa, enteric bacteria and viruses; fertilizers; gasoline and motor oils; automotive wastes; and pesticides including herbicides, insecticides, rodenticides, fungicides, and avidides	<ul style="list-style-type: none"> • Fertilizer, a source of nitrate, is used on the cropland within the study area. Elevated levels of nitrates have not been observed in the well water. • 4 barnyards (CAFOs), a source of nitrates, are located within the well's contributory area. Manure storage areas are associated with these barnyards. Manure is spread on the cropland within the well's contributory area • Pasture land is included within the well's contributory area • Pesticides and/or herbicides are used on cropland within the study area • Farm chemical storage areas and farm machinery areas, sources of automotive and welding wastes, are/may be located within the study area • Because the water from the wells is disinfected, agricultural activities are not a concern with respect to potential sources of microbiological contamination that could cause waterborne disease. 	<p>Medium-High</p> <p>Medium</p> <p>Medium</p> <p>Medium</p> <p>Low</p>
Residential Sources	Common household maintenance and hobbies; lawns and gardens; swimming pools; underground storage tanks	<ul style="list-style-type: none"> • Most, if not all residences use common household chemical products, and lawn and garden chemicals • Some residences have swimming pools which use pool maintenance chemicals 	Low-Medium
On-site septic systems	Pathogens, including cryptosporidium, and nitrates	<ul style="list-style-type: none"> • Approximately 185 homes and 15 businesses located within the study area, use septic systems • Approximately 17 septic systems are within the inner zone. These systems may have been installed before modern design standards and their integrity is unknown. Soils in the inner well zone are classified as high hazard of pollution from septic system. • Because the water from the springs/wells is disinfected, septic systems are not a concern with respect to potential sources of microbiological contamination that could cause waterborne disease. 	Medium (due to the confined characteristics of the aquifer)
Parklands and campground	Fertilizer; herbicides; insecticides	<ul style="list-style-type: none"> • Camp Wyomoco (4H) is located at the eastern edge of the study area 	Low

Underground storage tanks	Gasoline; heating oil; and other fuels (VOCs)	<ul style="list-style-type: none"> Recent figures released by NYSDEC indicated that in Wyoming County many property owners have not removed underground storage tanks. The number of such tanks in the study area is unknown 2 petroleum bulk storage sites are located on Route 20A in the Hamlet of Varysburg. The closest site is approximately 1000 feet from the well 	Low-Medium
Gasoline stations	Petroleum hydrocarbons and solvents	<ul style="list-style-type: none"> A gasoline station is located on Route 20A approximately 3500 feet from wells. 	Medium
Auto repair and car dealership	Oils; waste oil; solvents; acids; paints; miscellaneous wastes; gasoline storage	<ul style="list-style-type: none"> An auto repair shop on Centerline Road is located in the study area 	Low
Cemeteries	Leachate; lawn and garden chemicals	<ul style="list-style-type: none"> There are 3 cemeteries located in the study area 	Low-Medium
Commercial agricultural operations	Herbicides; insecticides; nitrates; fungicides; and other pesticides	<ul style="list-style-type: none"> There is a commercial agricultural operation on 20A approximately 1000 feet southwest of the wells. 	Low
Storage, warehouse and distribution	Various inventory	<ul style="list-style-type: none"> There is a storage, warehouse and distribution operation in study area on Route 20A approximately 1000 feet southwest of the wells. 	Low-Medium
Retail services (See Section II.3/Commercial Sources)	See Section II.3/Commercial Sources	<ul style="list-style-type: none"> There are 5 retail services operations in study area. The majority is located in the Hamlet of Varysburg on 20A within 1000 feet of the wells. 	Low-High
Wells – oil, gas, salt	Migration of brine and oils into groundwater aquifers	<ul style="list-style-type: none"> NYSDEC information indicates that there is a dry wildcat well in the study area approximately 2000 feet southeast of wells. 	Medium
Public utilities	PBSs from transformers and capacitors; oils; solvents; sludges; acid solution; metal plating solutions	<ul style="list-style-type: none"> There is a public utility facilities in the study area (NY Telephone). 	Low-Medium
SPDES Permits	Discharge	<ul style="list-style-type: none"> NYSDEC permitting information has identified a SPDES permit issued to Camp Wyomoco for surface water discharge. 	Medium
Spills	Spills from various sources including petroleum bulk storage, transportation services, industrial manufacturing & processing, residential, and chemical bulk storage	<ul style="list-style-type: none"> A spill was reported to NYSDEC on Centerline Road. 	Low

Bedrock Geology

Varysburg Study Area

Map 31

Wyoming
County

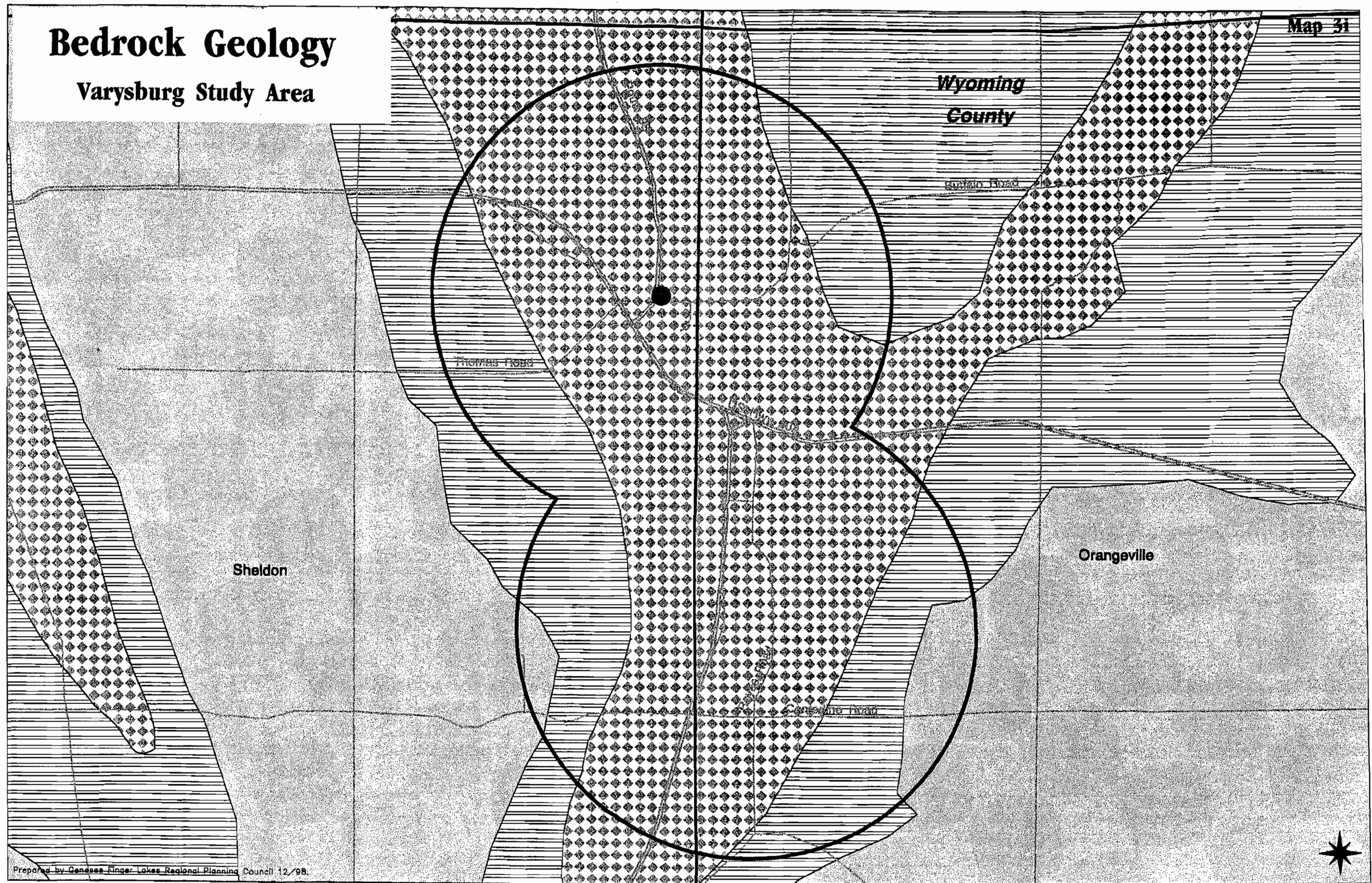
Sullivan Road

Thomas Road

Sheldon

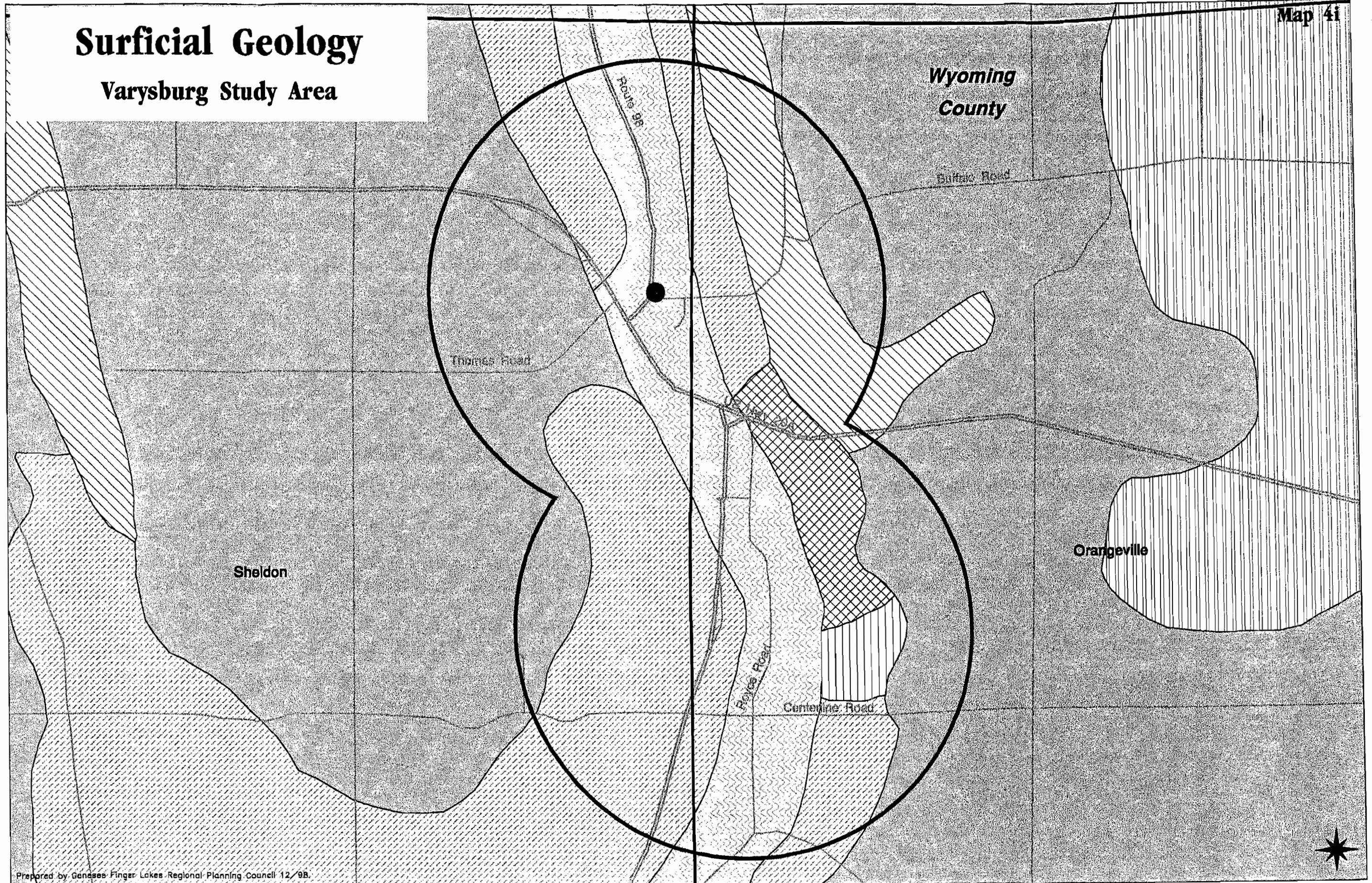
Orangeville

Carroll Road



Surficial Geology

Varysburg Study Area



Areas of Pollution Hazards Due to Soil Permeability

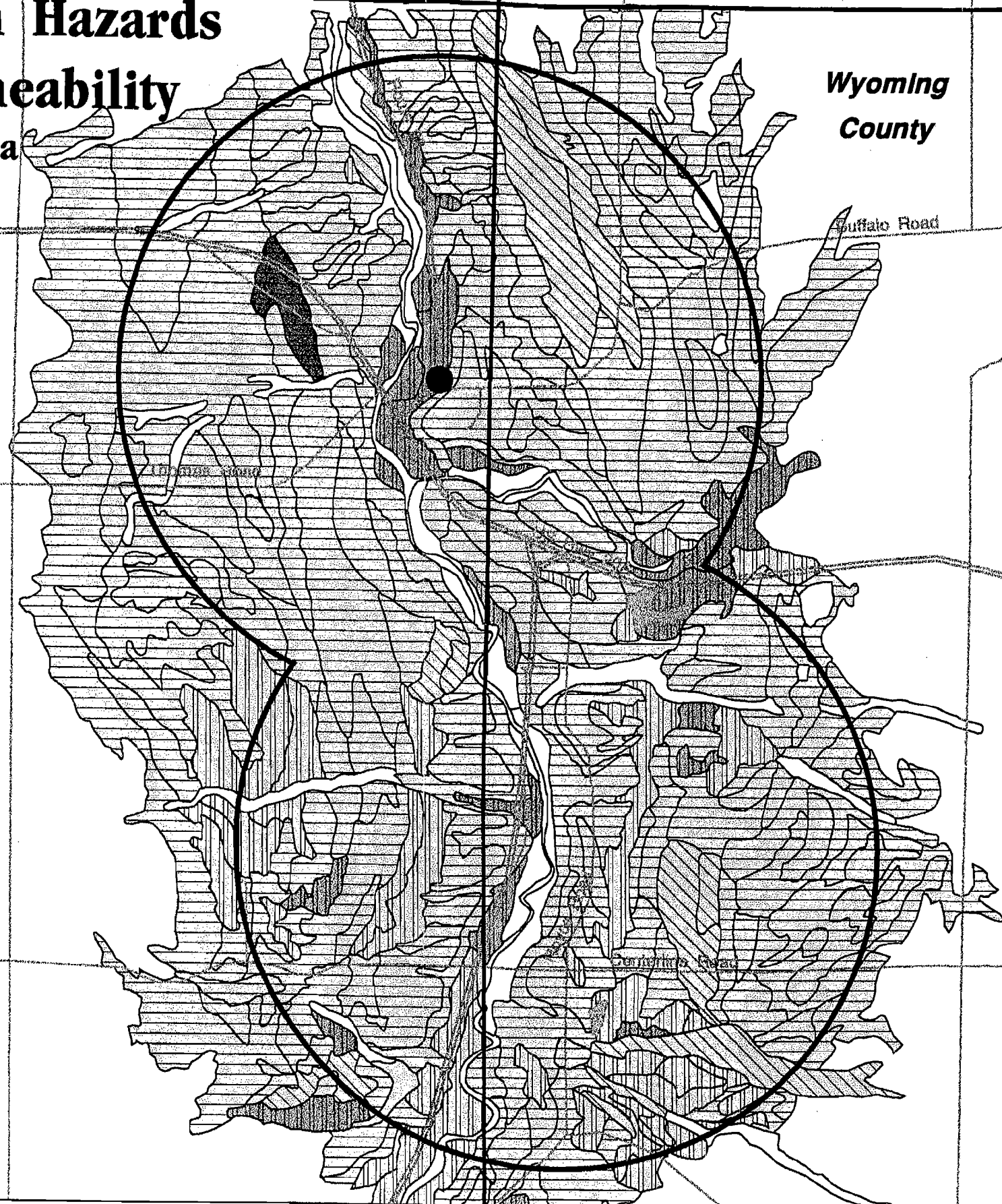
Varysburg Study Area

Wyoming
County

Buffalo Road

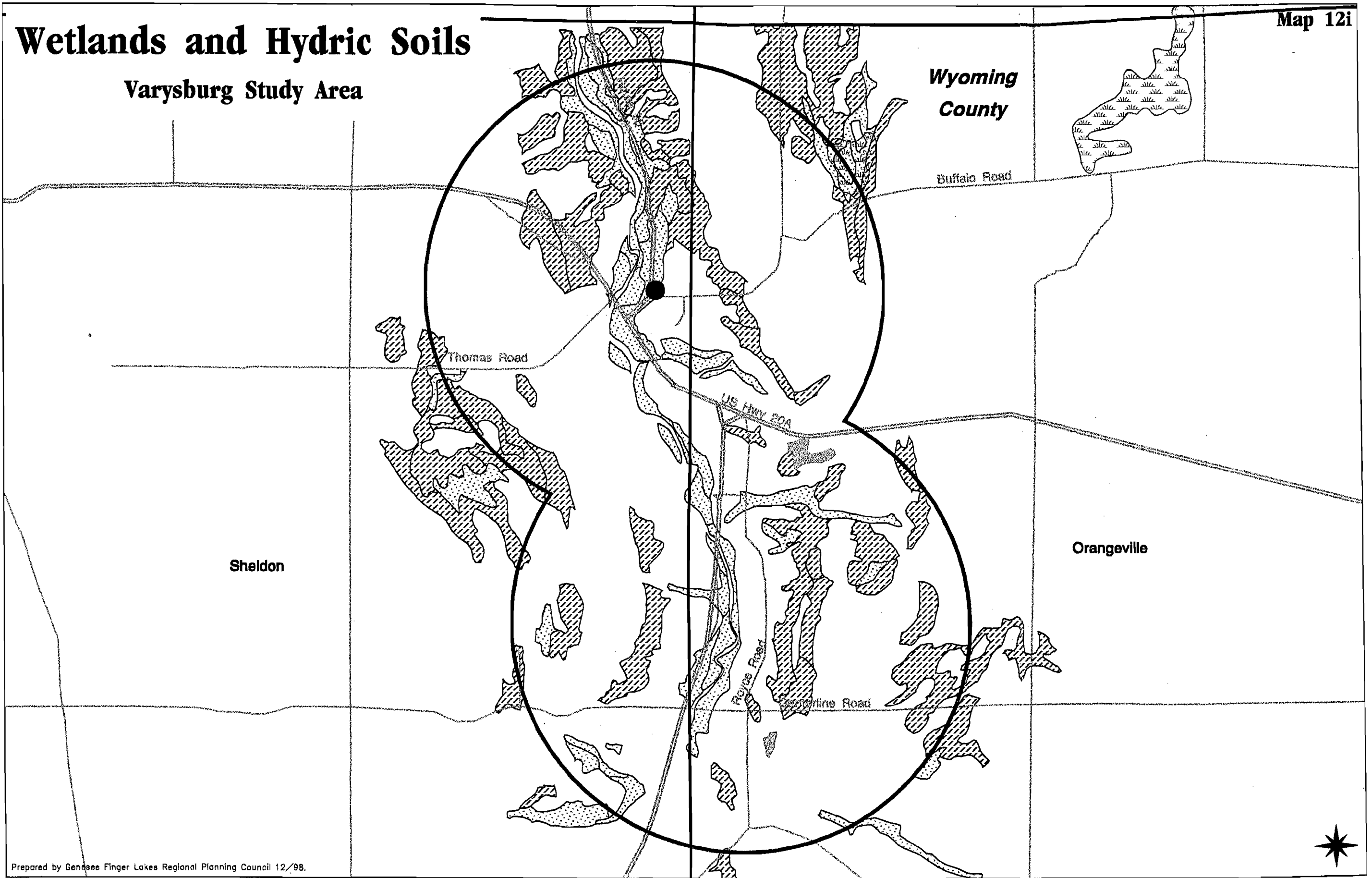
Sheldon

Orangeville



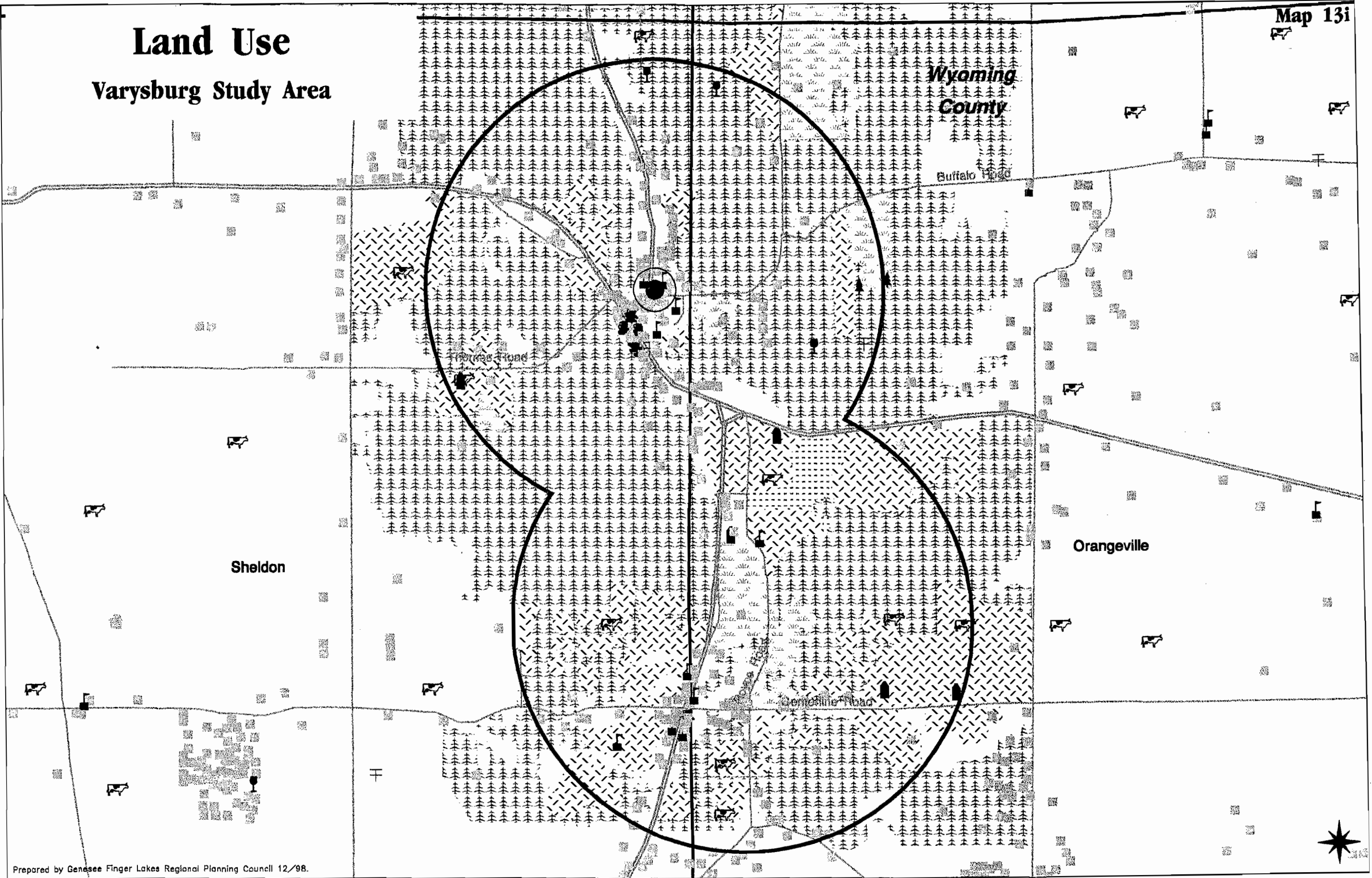
Wetlands and Hydric Soils

Varysburg Study Area



Land Use

Varysburg Study Area

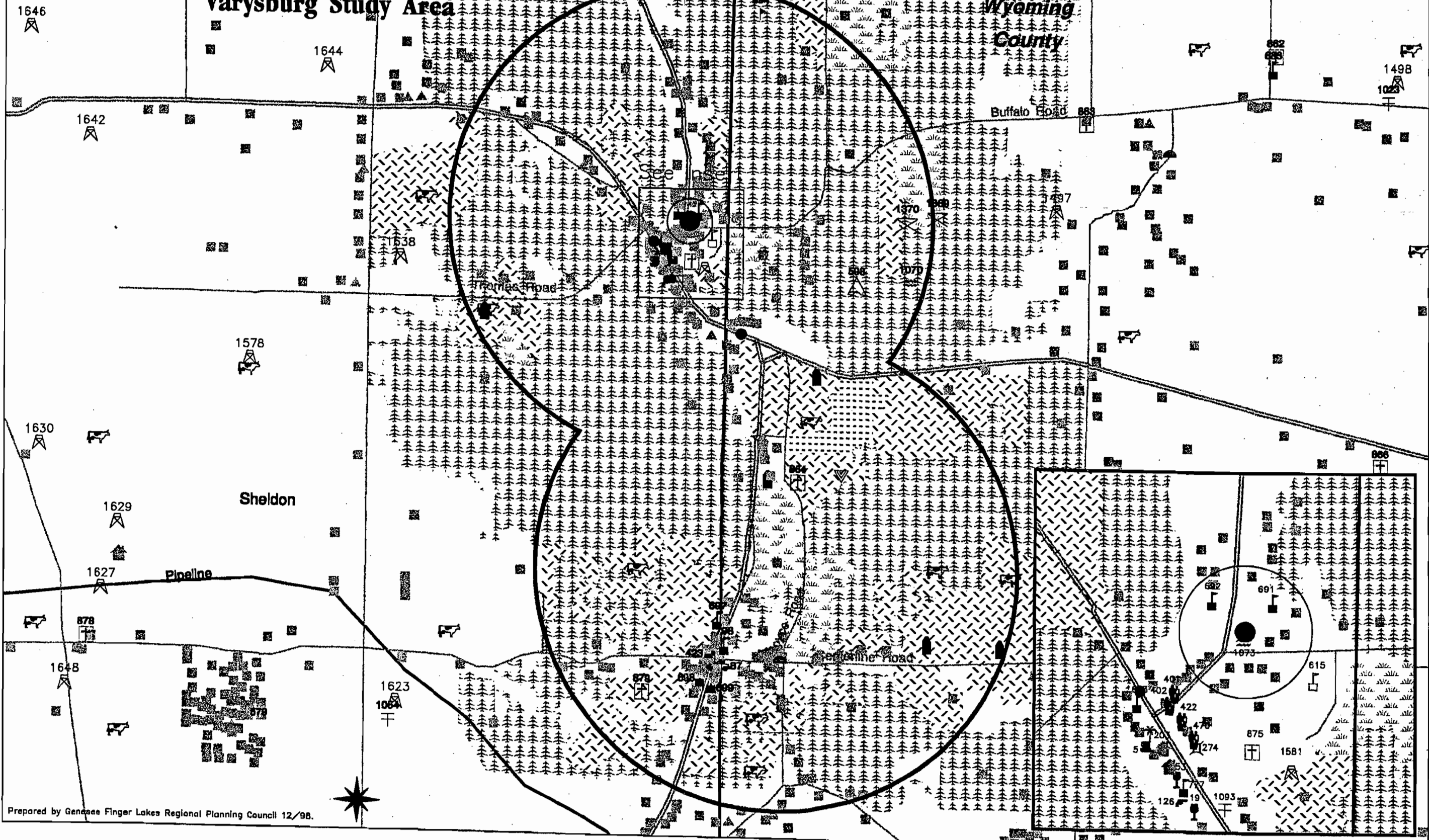


Potential Contaminants Inventory

Map 15i

Varysburg Study Area

Wyoming
County



Prepared by Genesee Finger Lakes Regional Planning Council 12/98.

III. Methodology Description

A. Delineation

Outer Well Zone

Delineating the outer well zone for the development of well head protection areas was a multi-step process. The initial step in the process was to place one mile radius around each wellhead. The remaining steps served to enlarge the wellhead protection area if necessary based on the following steps:

1. Delineation of watershed divides based on topography and areas of influence
2. Existence of 100 year flood plain
3. Existence of NYSDEC Wetland
4. Existence of a primary aquifer with consideration to direction of groundwater flow

The geographic information system was used to overlay these considerations which produced the final delineation.

Inner Well Zone

The inner well zone was designed to detect direct introduction of contaminants in the immediate well area. The proposed baseline delineation of the remedial action zone (inner well zone) has been set by NYSDEC as a fixed radius of 200 feet from the well. This zone is established to provide adequate protection against microbiological contamination. The NYS Department of Health also defines groundwater protection areas with the delineation of zones. Zone 1-g: the wellhead protection area, is defined as the area 200 feet from the well and extended to include the cone of influence where appropriate. Taking the study areas into account along with the above information an inner well zone was assigned a fixed radius of 500 feet around each well.

B. Natural Resources

Soils

The individual soil units within each study area were digitized from the County Soil Survey. Soil Unit Maps for all study areas are in Appendix F and are shown on Map9a-j, Soil Units. Based on the soil characteristics described in the Soils Surveys of Wyoming, Cattaraugus, and Genesee Counties, additional maps were created to identify areas where soil characteristics affect the potential for groundwater pollution. Map 7a-j, Steep Slopes and Erodibility, depicts slopes and the erodibility characteristics of the surface soils. Areas where bedrock is less than 3.5 feet or less than 40 inches from ground surface are shown on Map 10a-j, Shallow Depth to Bedrock and Groundwater. This map also indicates areas where there is a seasonal high water table (at less than 1.5 feet or within one to two feet). The soil permeability changes at various depths; therefore, soil permeability information was used to identify the hazard of pollution from septic systems (subsurface) and the hazard due to surface penetration of pollutants. This is especially important in that the Village of Arcade is the only municipality that is sewered and therefore without septic systems. This information is shown on Map 11a-j, Areas of Pollution Hazards due to Soil Permeability. Hydric soils have been included on the Wetlands Map. The following methodology was used:

Description	Code	Description
Slopes	0	(use last digit in unit name) 0% or unknown
	1	0-3% A
	2	3-8% B
	3	8-15% C
	4	15-25% D
	5	25-35% E
	6	35-60% F
Shallow Depth to Bedrock	0	(no)
	1	less than 3.5 feet
Seasonal High Water Table	0	(no)
	1	less than 1.5 or at 1 to 2 feet
Areas of Pollution Hazards due to Soil Permeability:		
Hazard of Pollution from Septic Systems	0	(subsurface horizon permeability) (no information and variable)

			1	high/severe
			2	medium
			3	low/slight
Areas of Pollution Hazards due to Soil Permeability:				
Surface Penetration Hazard				(surface horizon permeability)
			0	(no information and variable)
			1	high/severe
			2	medium
			3	low/slight
	Permeability Ranges			
	1	high/severe	> 2.0 and 0.63 – 6.3	
	2	medium	0.63 – 2.0	
	3	low/slight	< 0.2 and 2.0 – 6.3	
Hydric Soils			0	(no)
			1	hydric inclusions
			2	hydric soils
Erodibility				(K factor)
			1	low 0.17 to 0.2
			2	medium 0.24 to 0.28
			3	high 0.32 to 0.49

Watershed Divides

Watershed divides were delineated using the 7 ½ minute series of the USGS Topographic Quadrangle maps. The watershed divides were then digitized of the maps.

C. Physical Resources

Water Supply

The NYS Department of Health data was used to initially map wellhead locations. The locations were then verified with the use of a global positioning system and further review by the Technical Committee. Springs and Reservoirs were verified by review of the Technical Committee.

D. Political Boundaries

Zoning

Zoning for Genesee County was digitized off of the official zoning maps for the municipalities of Oakfield, Batavia, and Pembroke. Zoning maps can be found in Appendix F.

E. Contaminant Source Inventory

Land Use

Real Property – The Genesee, Cattaraugus and Wyoming County Real Property GIS parcel centroid files were acquired from the New York State Real Property Services. The land use attribute field within this database was used to thematically map land use as an overlay with the digital land use derived from the aerial photography. The real property based land use was then field checked. The final land use was used to assist in assigning potential sources of contamination within the study areas.

Aerial – High resolution 1:660' aerial photographs were delineated for land use and control points onto velum. The velum was then digitized, mapped and reviewed by the Technical Committee. Input from the review along with the real property based land use was then used to produce final land use maps which assisted in the development of study area potential sources of contamination.

Nonpoint Source Pollutants

The following databases were acquired from the New York State Department of Environmental Conservation:

Chemical Bulk Storage (CBS)

Major Oil Storage Facilities (MOSF)

Petroleum Bulk Storage (PBS)

Spills Information Database
Inactive Hazardous Waste Sites
Mined Land
Oil, Gas and Solution Mining
SPDES Permits

Data collected on spills reported to NYSDEC as required by one or more of the following: Article 12 of the Navigation Law, 6 NYCRR Section 613.8 (from PBS regulations), or 6 NYCRR Section 595.2 (from CBS regulations). This file includes spills that were active on 4/1/86 in addition to those reported from 4/1/86 through the most recent update. Upon acquisition of the database records with no coordinates where addressed matched so that the database could be used within the GIS.

CBS registration data is collected as required by 6NYCRR Part 596. It includes facilities storing hazardous substances listed in 6 NYCRR Part 597, in aboveground tanks with capacities of one hundred eighty five (185) gallons or greater, and/or in underground tanks of any size. It includes facilities registered (and closed) since effective date of CBS regulations (July 15, 1988) through the most recent update. Upon acquisition of the database records with no coordinates where addressed matched so that the database could be used within the GIS.

PBS data is collected pursuant to 6 NYCRR Part 612. It includes facilities (underground and/or aboveground tanks) storing petroleum with a storage capacity in excess of eleven hundred (1,100) gallons and less than four hundred thousand (400,000) gallons. It includes registered used oil tanks (and closed) since effective date of PBS regulations (December 27, 1985) in addition to those added, updated or closed through the most recent update. Upon acquisition of the database records with no coordinates where addressed matched so that the database could be used within the GIS.

MOSF facilities are licensed pursuant to Article 12 of the Navigation Law, 6 NYCRR Part 610 and 17 NYCRR Part 30. These facilities may be offshore facilities or vessels, with petroleum storage capacities of four hundred thousand (400,000) gallons or greater. It includes MOSF's licensed or closed since April 1, 1986, (responsibility was transferred from NYDDOT on October 13, 1985) and data obtained from NYSDOT for facilities licensed since Article 12 became law on April 1, 1978. Upon acquisition of the database records with no coordinates where addressed matched so that the database could be used within the GIS.

Inactive Hazardous Waste Sites, Mined Land, and Gas, Oil and Solution Wells are New York State Department of Environmental Conservation GIS datasets. These are acquired in ArcInfo GIS format and integrated into the project database.

SPDES databases are maintained by New York State Department of Environmental Conservation Regional Offices. In records where there is no known coordinate sites are addressed matched. All records were then integrated into the GIS project database.

Salt Storage/Road Deicing – Municipalities and counties were sent a Salt Storage/Road Deicing Inventory and Survey (see Appendix B1) along with the New York State Department of Transportation Regional offices in August 1998. Using the Dillman method for survey response, reminders were sent at four week intervals. After the third reminder notice reminder calls were made to ensure full response. The two page survey inventoried salt storage and road deicing material and methodology and requested the location of each salt storage pile and/or facility. These locations were then digitized and integrated into the GIS project database.

Pipelines – USGS Topographic Quadrangle maps were used to digitize pipelines. This became part of the GIS project database.

Sewer Districts (septic) – Sewer district maps digitized into the project database where applicable. All other portions or the study areas are considered to have septic systems.

Water System Inventory – Water suppliers in the study area were asked to fill out a two page Water System Inventory (see Appendix B2) that considers contact information, water system data, and source of supply and areas of concern. This data was then used for the system analysis.

F. Susceptibility Analysis

The susceptibility analysis for each study area is given in Chapter II *Source Water Assessments*, Sections A through J in Tables 2a-j *Study Area Contaminants* and discussed in detail in Chapter II Section A and B/4 *Susceptibility* for study areas in Genesee County and Section C through J/3 *Evaluation of Significant Potential Sources of Contamination and Susceptibility* for study areas in Wyoming County.

The categories used for Table 2a-j are as follows: (1) Potential Sources of Contamination; (2) Contaminants of Concern; (3) Description; and (4) Potential Impact to Water Supply (i.e. susceptibility).

Only the potential sources of contaminants within a particular study area are included on the respective Table 2 *Study Area Contaminants* column (1). These potential sources of contamination are derived from the associated Table 3. Individual listing of all potential sources of contamination within the associated study area is listed in the associated Table 3a-j *Potential Sources of Contamination*.

Column (2) Contaminants of Concern is derived from the following sources: (a) *A Guide to Wellhead Protection*, John Witten and Scott Horsley, Identification of Contaminant Sources section with emphasis on the Landfills, Septic Systems, Sewage Treatment Plants, Commercial/Industrial Land Uses/Hazardous Waste Generation, and Agricultural Land Uses subsections and Appendix B. Commercial/Industrial Land Uses/Hazardous Waste Generation (see Appendix C) along with Table 27 Contaminant Hazard Potential Ranking of Waste, Classified by Source (see Appendix H) and (b) *EPA Seminar Publication, Wellhead Protection: A Guide for Small Communities* Table 3-2 Potentially Harmful Components of Common Household Products (see Appendix C) and Table 4-4 Potential Sources of Ground Water Contamination. The above sources contribute to the susceptibility analysis in two ways. First, they supply a link between the potential sources of contamination and recognized contaminant categories. Second, they supply one of the ranking systems factored in for potential impact to water supply.

Column (3) Description qualifies and quantifies the potential sources of contamination and contaminants of concern given in Columns (1) and (2) and uses (a) and (b) from the above section as well as the following considerations:

Inner Zone versus Outer Zone (Study Area) (see Section A. Delineation) where all susceptibility considerations for Column (4) were weighed in relation to location in or near inner zone

Well Type and Depth derived from Water System Inventory (see Appendix B2)

Wyoming County Health Department Inspection Reports

Spring Supply Locations (potential for surface effected)

Flood Plain Locations within Study Area (see Appendix F and G: Hydrography and Watershed Divides)

Contaminant Categories (see Chapter III. Section E. Contaminant Source Inventory/Land Use and

Nonpoint Source Pollutants) derived from data on Tables 3a-j

Soils (see Section B. Natural Resources/Soils)

For the purposes of susceptibility analysis soils data was used with special attention given to Seasonal High Water Table, Areas of Pollution Hazards Due to Soil Permeability given Hazard of Pollution from Septic Systems and Surface Penetration Hazard

Column (4) Potential Impact to Water Supply (i.e. susceptibility) is derived from using the following in association with (a) and (b) above to link (1) potential sources of contamination and (2) contaminants of concern with contaminant categories associated with the following:

Draft Source Water Assessment Program Plan, New York State Department of Health, Bureau of Public Water Supply Protection

Table 4 – Potential for Groundwater Contamination Based on Land Cover (rankings of negligible, low, medium and high) (see Appendix H)

Table 6 – Potential for Contamination of Ground Water from Discrete Sources (rankings of possible and not probable) (see Appendix H)

Aquifer Type

Groundwater sources in unconfined aquifers or conditions of high hydraulic conductivity such as fractured bedrock and karst geology are likely to provide less of a physical barrier to contamination, and therefore may be more sensitive (given a rank of high), than supplies that are in deep, confined aquifers.

Soils (see Section B. Natural Resources/Soils)

For the purposes of susceptibility analysis soils data was used with special attention given to Seasonal High Water Table, Areas of Pollution Hazards Due to Soil Permeability given Hazard of Pollution from Septic Systems and Surface Penetration Hazard. The rankings given follow the rankings on Maps 11a-j of high, medium and low.

Flood Plain Locations within Study Area (see Appendix F and G: Hydrography and Watershed Divides) with special consideration of Inner Well Zone or Spring Supplies. Ranking of high is given if major floodplain is in inner well zone or spring supplied. Ranking of medium is given if major floodplain is near inner well zone or spring supplied. Ranking of low is given if major flood plain is in study area but not in or near inner well zone.

Inner Zone versus Outer Zone (Study Area) (see Section A. Delineation) where all susceptibility considerations (e.g. contaminant sources, surface penetration, aquifer type) in or near the Inner Zone are given a higher ranking versus the Outer Zone.

Well Type and Depth derived from Water System Inventory (see Appendix B2). Rankings are given high to low inversely related to depth of well with consideration of potential for infiltration.

Wyoming County Health Department Inspection Reports. Ranking from high to low given level of citations in the documentation.

IV. Description of Appendices

A. List of Available Information

Appendix A: Regional Wellhead Information

The Regional Wellhead Information is an inventory of all regional public supply groundwater facilities by county with the exception of the nine assessment areas covered in this report. The inventory includes system name, municipality served, population served, volume of water in gallons per day, problems associated with wellfield and recharge area, system contact person, contact phone number, contact municipality, contact address and contact zip code.

Appendix B1: Salt Storage/Road Deicing Survey and Inventory

The Genesee/Finger Lakes Regional Planning Council conducted a Salt Storage/Road Deicing Inventory of all municipalities and counties in the region along with the New York State Department of Transportation to get an understanding of local, county, state and federal road salting and salt storage practices and locations. Results of the inventory for the areas covered by this study can be found in this appendix.

Appendix B2: Water System Inventory

The Genesee/Finger Lakes Regional Planning Council (for Genesee County) and Wyoming County Economic Development and Planning (for Wyoming County) conducted a Water System Inventory of the nine study areas covered in this report. The purpose of the inventory was to get a better understanding of water supply data, the source of the water supply and areas of potential concern to the study area municipalities.

Appendix C: Residential Sources of Contamination & Potentially Harmful Components of Common Household Products

A description of residential sources of contamination and a listing of potentially harmful components of common household products. The listing is derived from Natural Resources Fact: Household Hazardous Wastes, Fact Sheet No. 88-3, Department of Natural Science, University of Rhode Island, August 1988 lists Potentially Harmful Components of Common Household Products.

Appendix D: Well Logs

Log of Test Hole No. T-13 Pavilion Water District No. 1, Pavilion, New York

Appendix E: List of Resources

List of Resources is a comprehensive list of resources used by the Genesee/Finger Lakes Regional Planning Council for preparation of this report.

B. List of Additional Maps

The following additional maps are in Appendix F

Study Area Letter

- A. Village of Oakfield
- B. Town of Pavilion
- C. Arcade Village North
- D. Arcade Village South
- E. Bliss
- F. North Java
- G. Village of Pike
- H. Village of Silver Springs

- I. Varysburg
- J. Village of Wyoming

Map Series

- 6. Topography
- 7: Steep Slopes and Erodibility*
- 8. Hydrography and Watershed Divides*
- 9. Soil Units*
- 14. Zoning*

* Map Legends are in Appendix G

Appendix A
Regional Wellhead Information