LYCOMING COUNTY
PENNSYLVANIA

WATER SUPPLY PLAN

LYCOMING COUNTY PLANNING COMMISSION
48 West Third Street
Williamsport, PA 17701

Prepared By

Science Applications International Corporation
6310 Allentown Boulevard
Harrisburg, PA 17112

September 2001
FINAL

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APPENDICES

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LIST OF APPENDICES

ACKNOWLEDGMENTS

The Lycoming County Water Supply Plan would not have been possible without the active participation of the 65+ member Watershed Plan Advisory Committee, a diverse group of public and private water suppliers, municipal officials, business representatives, agency officials, and other interested citizens. Please see the attached membership list. In addition to six half-day work sessions, this group devoted considerable time outside of the meetings reviewing and commenting on the information and recommendations of the Plan. The County water suppliers are to be especially commended for their openness and willingness to allow our consultant to inspect their facilities which added immensely to the accuracy and usefulness of this document. The Advisory Committee has also urged that this Plan be kept updated and has volunteered to reconvene periodically to help in the updating.

In addition, the Lycoming County Commissioners and the Lycoming County Planning Commission proactively recognized the need to plan for our future water supplies, authorized the staff to pursue funding and to develop the Plan, and provided input throughout the project. Where appropriate, the Commissioners and Lycoming County Planning Commission will help to implement the Plan recommendations. For example, the identified capital projects will be incorporated into the Lycoming County Capital Investment Plan which is a guide for State and Federal grant initiatives.

This project was funded through a grant from the PA Dept of Environmental Protection. Thomas Franklin, as the DEP project manager, provided timely support and input into the development of the Plan. Our consultant was also assisted by the DEP Northcentral Regional Office.

Finally, the consultant, Scientific Applications International Corporation, Inc., must be recognized for their innovative approach to identifying and addressing Lycoming County water supply issues, persistence in resolving tough data problems, their responsiveness to Advisory Committee concerns, and especially for their long-range planning perspective.

All of these parties have helped to develop and refine the Lycoming County Water Supply Plan. The County Commissioners and the Lycoming County Planning Commission encourage this input to continue, and will monitor the Plan to ensure follow-through on the recommendations and updates as needed.

LYCOMING COUNTY, PENNSYLVANIA
WATER SUPPLY PLAN ADVISORY COMMITTEE

Name	Company
Joyce Hall	ABC 2 Mobile Home Park
Rick Buck	Allenwood Federal Prison Camp
James Stout	American Tempo Village Park
Neil Barto	Barto's Trailer Court
George Bittner	Bittners Mobile Home Park
George Weigand	C G Renn Elementary School
William J. Carpenter	Carpenters Mobile Home Park
Stanley Brass	Cogan Valley Mobile Home Park
Dale L. Winter	Collomsville Mutual Waterworks
Steve Fisher	Construction Specialties
Tom Franklin	DEP Bureau Of Water Supply Management
Karen Snyder	Elimsport Elementary School
Thomas Clemens	Fairlawn Trailer Court
Phillip Hall	Foxcroft Manor Mobile Home Park
George Weigand	George Ferrell Elementary School
David Liberti	Harvest Moon Trailer Court
Kenneth Weimer	Heatherbrooke Estates
James E. Etzel, Jr.	Hepburn Lycoming Elementary School
Rebecca Fought	Hughesville Borough Water Authority
Burt Davis	Hughesville Borough Water Authority
Dale Cahn	Hughesville Borough Water Authority
Sister Mctague	Immaculate Conception School
Michael C. Zellers	Jersey Shore Area Joint Water Authority
Rick Lefever	La Sa Quik
Pat Weber	Limestone Township Water Authority
John Humphrey	Limestone Township Water Authority
Floyd Lindsay	Loyalsock Mobile Home Park
Robert Wirth	Loyalsock Valley Elementary School
Tom Corbett	Lycoming County Conservation District
Chip Amer	Lycoming County Water & Sewer Authority
Steve Gilbert	Lycoming Mall Crown America
Robert Eichensehr	Lycoming Valley Jr. High School
Robert Morgan	Meadow Brook Mobile Home Park-C/O Pocono LLC
John D. Lynch, Sr.	Montgomery Borough Water & Sewer Authority
Frank Tallman	Montoursville Water Company
Ken Camp	Mountain Laurel Mobile Home Park

LYCOMING COUNTY, PENNSYLVANIA
WATER SUPPLY PLAN ADVISORY COMMITTEE

Name	Company
Floyd Lindsay	Mountain Laurel Mobile Home Park
Gary Saam	Muncy Borough Water Company
Blain Paglus	Muncy Correctional Institute
Kim Rager	Muncy Homes, Inc.
Dr. Bruce Mosser	Nisbet Elementary School
Joyce Hall	Oak Lynn Manor Mobile Home Park
G. W. Peterman	Orchard Mobile Home Park
Walter Nyman	Pennsylvania College Of Technology
Jeff Hoover	PA DEP
John Leo	PA DEP
Ryan Mccall	PA DEP
Terry Knittle	Pinecrest Village Mobile Home Park
Scott Overdorf	Pleasant Pines Mobile Home Park
Gale Orr	Ralston Area Joint Authority
Wibbe Jelsma	Roaring Branch Waterworks
Katherine Daniels	SAIC
Michael Haufler	SAIC
Don Machusak	SAIC
Steve Metzler	SAIC
Govt Relations	Susquehanna Division Serv PP&L
Frank Perano	Tiadaghton View Mobile Home Park
James Stout	Timberend Estates Mobile Home Park
Frank Perano	Twin Hills Mobile Home Park
Phillip Hall	Vali View Mobile Home Park
Steven Confair	Village Water Incorporated
John Gasperine	Waterville Water Association
John Shrimp	Weis Market #93
Dennis Meckley	West Pharmaceuticals
Charles Rulapaugh	White Deer Golf Clubhouse
Ellis Wettlaufer	Wilawan Mobile Home Park
Bob Engel	Williamsport Chamber Of Commerce
Walt Nicholson	Williamsport Municipal Water Authority
Joan Heck	Woodward Township Elementary School

LIST OF ABBREVIATIONS

AL	Action Level
ASA	Agricultural Security Area
AWSR	Annual Water Supply Report
AWWA	American Water Works Association
BMP	Best Management Practice
CWS	Community Water System
DEP	PA Department of Environmental Protection
EOP	Emergency Operations Plan
ERP	Emergency Response Plan
Extension	PA State Cooperative Extension Service
FEMA	Federal Emergency Management Agency
gal	gallon
gpd	gallons per day
GIS	Geographic Information System
LCCD	Lycoming County Conservation Distict
LCCPU	Lycoming County Comprehensive Plan Update
LCPC	Lycoming County Planning Commission
LCSWA	Lycoming County Sewer and Water Authority
MCL	maximum contaminant level
mgd	million gallons per day
mg/l	milligrams per liter
MHP	mobile home park
mi2	square mile
NA	not applicable
NCWS	Noncommunity water systems
NPDES	National Pollution Discharge Elimination System
NRCS	US National Resources Conservation Service
O&M	Operation and Maintenance
PADWIS	PA Drinking Water Information System
pCi/l	picocuries per liter
PENNVEST	PA Infrastructure Investment Authority
psi	pounds per square inch
PUC	PA Public Utility Commission
PWS ID	PA Water System Identification
Q	pumping rate
SDWA	Safe Drinking Water Act
SRBC	Susquehanna River Basin Commission
swm	storm water management
SY	Safe Yield
UNK	unknown value
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WHP	wellhead protection

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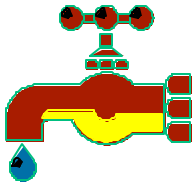


EXECUTIVE SUMMARY

The Lycoming County Commissioners authorized this County Water Supply Plan, funded in part by a grant from the Pennsylvania Department of Environmental Protection. The primary purposes of this Plan are to: 1) evaluate existing community water system capabilities, 2) project future water needs, 3) identify service deficiencies, 4) evaluate alternative solution strategies and 5) make recommendations to promote coordination and consistency with County and municipal planning efforts. This Plan primarily addresses the need for safe and adequate drinking water supplies and does not touch on recreational, wildlife, energy or other similar water uses.

During 1999, average estimated water use in Lycoming County for all purposes was approximately 16 million gallons per day (mgd). This includes approximately 10 mgd provided by community water systems, an unknown amount provided by noncommunity water systems, over two mgd in other industrial, commercial and agricultural withdrawals and almost four mgd from on-lot residential water wells. The bulk of the analysis in this Plan is devoted to community water systems as they provide the majority of potable water within the County.

Lycoming County includes 37 community water systems, which serve populations ranging from 49 to over 48,000. The total population served by these systems is 74,632. The County's community water systems provide water for residential, commercial, industrial, institutional and other water uses. They include one large system, two medium-sized systems and 34 small systems. Eight systems are municipal or managed by authorities, three are water associations, 23 serve mobile home parks, one is investor-owned and one each are federally and state owned (both institutional uses). These systems obtain their water primarily from wells; only a few obtain water from streams or springs, though a large proportion of water used is from streams. Average daily water use is 64 gallons per day (gpd), while average peak daily water use is 107 gpd.

There are generally good water supplies available for most systems across the County, although a number of systems would benefit from improvements to assure that in times of drought or other water shortage they will continue to have adequate water supplies. Three systems have inadequate safe yields to meet current peak needs, meaning that in times of drought, these water supplies may be inadequate; one other system has an unknown safe yield and should be evaluated. Eleven systems are reliant on relatively few sources of water and would have inadequate safe yields if their best water source went out of service for any reason. As many as 11 systems lack an emergency response plan and some plans are inadequate or out-of-date. As many as 27 systems lack an emergency power generator, and all but one system apparently lack any contractual arrangement for water in time of emergency. The Plan includes a discussion of potential future water sources for the five recommended new community water systems that could serve anticipated new growth as well as remedial areas of contaminated groundwater.

Most of the County's community water systems have generally good water quality. The challenge will be to ensure continued good water quality in the future and specifically compliance with new Safe Drinking Water Act requirements. All systems provide, at a minimum, disinfection, while six provide full filtration. At least two to three additional systems may require filtration because their groundwater sources are or may be influenced by surface water. Twenty-seven systems have not been and need to be evaluated by the DEP. At least seven systems are concerned about nearby potential contaminant sources and seven more have taken steps to protect groundwater quality. One system has a DEP-approved wellhead protection plan and another has one in the works. System improvements to enhance water supply should be accompanied by wellhead protection programs to protect water quality. This Plan provides a five-step process that communities can use to protect public water supply wells from potential contaminant sources. A variety of voluntary as well as regulatory tools and techniques that can be employed by water systems and municipalities is described in the Plan and its appendices. A database of major federal and state contaminant sources is also included in the Plan to enable municipalities and systems to protect existing wellheads and site future ones to avoid potential contamination.

There is inadequate finished storage among about half of the County's community water systems. Two systems provide no finished water storage while 17 more do not meet recommended minimum storage standards. Of the 12 fire-hydrant systems that have firefighting capabilities, four have insufficient storage. A number of systems need distribution system improvements. At least 13 systems lack both hydrants and blow-off valves, which means that these systems cannot be effectively flushed. Eleven systems lack cross-connection control programs to prevent contamination of water. Only five systems have adequate piping diameter to permit interconnection with another system, and only seven have adequate piping diameter for firefighting purposes.

Many systems are in need of management improvements, chiefly mobile home parks. Eighteen systems lack certified primary operators while 31 systems lack certified secondary operators. As many as 23 systems lack approved Operation and Maintenance Plans and 13 systems have not submitted their 1999 AWSRs to the DEP. Management could be improved at the system level with the active involvement of DEP and a system for the more frequent updating of system data. Five of the 12 systems that are required to keep separate financial records for water do not meet minimal standards, while 25 other systems that are not required to keep such records (mostly mobile home parks) would nevertheless benefit from keeping such records.

By 2020, the need for system improvements will be even greater than it is today. It is estimated that needed system structural improvements will cost nearly three million dollars. Additional needed improvements identified by systems themselves could cost over $24 million. This Plan makes recommendations for both stand-alone improvements to community water systems and, in some instances, regional solutions to achieve economies of scale and increased coordination and cooperation. Regional solutions may, out of necessity, rely on the capabilities of the strongest systems. The most efficient and effectively managed systems should be encouraged to assume responsibility for expanded service and, in some instances, to incorporate weaker systems.

The following tables summarize the major recommendations of this plan, including implementation measures and a proposed timeframe for enhancement of systems. Actions suggested for short-term implementation should be initiated within a year. Recommendations with a mid-term status should be initiated within three years, while those suggested for long-term implementation should be undertaken within five years. Recommendations are also set forth for continuing actions.

Local Planning - "Local planning" recommendations refer to those for which water systems and municipalities are responsible. These recommendations focus on local water supply and source protection planning:

- Local Planning -

Recommendation	Responsible Party	Time Frame
1. Evaluate stand-alone & regional solutions to system problems	Water systems, municipalities & LCPC	Short-Term
2. Evaluate &, where appropriate, revise water rate structure	Water systems	Short-term
3. Evaluate & revise local planning & zoning to direct growth towards areas with infrastructure capability	Municipalities & LCPC	Short-term
Undertake system structural, management & financial improvements	Water systems	Mid-Term
5. Update emergency response & emergency operations plans	Water systems & Municipalities	Mid-Term
6. Develop, adopt & implement wellhead/ watershed protection plans	Water systems, municipalities & LCPC	Long-Term
7. Purchase land or easements for all Zone I wellhead protection areas	Water systems, municipalities & LCPC	Long-Term
8. Provide notice of proposed major land & development activities to systems	Municipalities and LCPC	On-going
9. Coordinate future water service areas with local planning & zoning	Water systems, municipalities & LCPC	On-going

Technical Assistance - These recommendations are intended to support local planning efforts by providing technical assistance, guidance and funding to water systems and municipalities. These recommendations would be undertaken by the County.

- Technical Assistance –

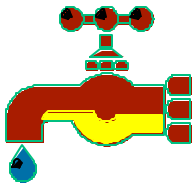
Recommendation	Responsible Party	Time Frame
1. Digitize all available coverages of Potential contaminant sources & make available to systems & municipalities	LCPC	Short-Term
2. Assist municipalities in setting up hazardous waste collection days	LCPC and DEP	Mid-Term
3. Assist municipalities in developing OLDS management programs	LCPC and DEP	Mid-Term
4. Assist municipalities in adopting & implementing on-lot well ordinances	LCPC and DEP	Mid-Term
4. Continue to develop stormwater plans & integrate at local level	LCPC	Mid-Term
5. Assist in the creation of new systems & the integration of existing systems	LCSWA and LCPC	Long-Term
6. Assist municipalities & systems in Developing source protection plans	LCPC and DEP	On-Going
7. Assist water systems in pursuing funding from DEP for system improvements & source protection	LCPC and DEP	On-Going
8. Develop a complete database on noncommunity water systems throughout the County	DEP	Mid-Term
9. Correct, update, and maintain database on community water systems throughout the County	DEP	Mid-Term

Community Support - These recommendations are intended to support local planning efforts by helping to implement water supply and wellhead protection programs. They would be undertaken by a wide variety of public and private groups working cooperatively together.

- Community Support -

Recommendation	Responsible Party	Time Frame
1. Appoint & involve municipal Environmental Advisory Councils to Assist in water planning efforts	Municipalities	Short-Term
2. Develop additional groundwater Monitoring wells	USGS	Mid-Term
3. Continue to assist farm community With conservation plans, nutrient Management plans, integrated pest Management plans & other BMPs	Lycoming County Conservation District & State Cooperative Extension Service	On-Going
4. Assist systems & municipalities in Developing educational & other Programs to protect water resources	PA Rural Water Association, League of Women Voters	On-Going
5. Assist in watershed protection efforts	Watershed Associations	On-Going

I. COUNTY WATER SUPPLY PLANNING INFORMATION



A. INTRODUCTION

Lycoming County, located in the northcentral region of Pennsylvania, is geographically the largest of Pennsylvania's 67 counties, and includes 52 municipalities. Williamsport, the County seat, is the major metropolitan center for this part of the State. Linked by interstate highways to urban areas within a half-day's drive, the County's attractive rural setting is also becoming increasingly popular for seasonal and retirement residences.

Lycoming County has recently undertaken a series of economic development initiatives to improve the County's infrastructure and attract new growth and development. A key element in planning for the future of Lycoming County will be the availability and quality of the County's water supply. To ensure that existing and future County residents and businesses continue to enjoy a plentiful clean water supply into the future, the County has embarked on the development of a Water Supply Plan. In the winter of 1999, Lycoming County Commissioners received a grant from the Pennsylvania Department of Environmental Protection, County Water Supply Grant Program for this purpose. A Countywide advisory committee, consisting of representatives from community water systems and a variety of other individuals with expertise and interest in water issues, was organized to assist and participate in the development of the Water Supply Plan.

The primary objectives of the Water Supply Plan are to:

- Project future potable water demands to the year 2020.

- Evaluate the ability of the County's community water systems to meet projected future water demands based on structural, managerial and financial considerations.

- Help ensure that all community water systems have the long-term capacity to meet Safe Drinking Water requirements.

- Recommend a variety of approaches to improve the ability of existing and potential new systems to deliver water to existing and future residents in the most effective and economical ways possible.

- Propose future water service areas which are coordinated and consistent with the recommended growth areas of the County's Comprehensive Plan.

- Enhance communication and coordination between municipalities and community water systems to facilitate continued effective water planning into the future.

B. GEOLOGIC OVERVIEW

An understanding of the physical geographic factors that influence groundwater availability and quality is important. Geology is a prime determinant of groundwater quality and quantity. Certain rock types and structures convey water better and yield more abundant water sources. The chemical composition of rock can contribute to the chemical properties of groundwater, and rock types and structure can affect the transport rates of groundwater and the vulnerability of groundwater to potential contamination.

Surficial Topography - Lycoming County occupies part of two geomorphic provinces, the Appalachian Plateau Province and the Valley and Ridge Province. The Appalachian Plateau, comprising the northwestern part of the County, is in places more than 2000 feet in elevation and deeply dissected by a series of major streams including Pine Creek, Lycoming Creek and Loyalsock Creek. Low, rolling hills characterize the land just north of the Susquehanna River, while to its south, high-crested ridges and narrow valleys typical of the Valley and Ridge Province dominate.

Bedrock Geology - The rocks that underlie Lycoming County are millions of years old, originally deposited as layers of sand gravel, silt and limy sediments. These materials have since formed sedimentary rocks of the shale, sandstone, conglomerate and limestone variety. Faulting, tilting, folding and uplift, followed by erosion, have exposed these rocks and shaped the County's landscape. The various exposed rock formations in the County were formed during five recognized geological periods, the oldest being the Ordovidian, followed by the Silurian, Devonian, Mississipian and Pennsylvanian. A more detailed discussion of County geology is presented in a later chapter of this plan.

C. WATER OVERVIEW

Lycoming County lies entirely within the Susquehanna River Basin. The West Branch of the Susquehanna River flows through the County for a distance of 38 miles and collects the drainage from numerous tributaries (altogether 2,200 miles) fed by the surrounding mountains. The County is drained by the following major tributaries: Pine Creek, Little Pine Creek, Larry's Creek, Lycoming Creek, Loyalsock Creek, Muncy Creek, White Deer Hole Creek and Antes Creek. In addition to these, numerous smaller tributaries flow directly into the river as it flows through the County.

1. QUANTITY OF AVAILABLE WATER

Hydrologic Cycle - Normal annual precipitation averages between 35 inches in the northwest of Lycoming County to 42 inches in the southeast. While about 70% of this precipitation

evaporates or transpires back into the atmosphere, about six percent runs into streams as surface runoff, and about 24% infiltrates into the soil as groundwater. Groundwater recharge occurs at rates dependent on the texture and composition of soil and underlying strata, on the slope of the land, on the amount of vegetative cover, and on impervious surface area. Groundwater that is not withdrawn for consumptive use returns to the surface as groundwater discharge or "baseflow" to streams or leaves the County underground to other adjacent counties.

G***roundwater Yields*** - Glacial lake and stream deposits are the most productive sources of groundwater in Lycoming County. These deposits are located primarily in the river and stream valleys and underlay the majority of the industrial areas in the County. Wells drilled into this material can yield from 50 to as much as 300 gallons per minute and supply large quantities of water to numerous industrial, public and domestic water users. There is generally adequate groundwater availability within the County. However, certain areas have limited groundwater supply and in dry or drought years, groundwater availability is reduced, particularly in shallow wells that do not adequately penetrate underlying aquifers. For several years in the mid-90s there were groundwater shortages in parts of Piatt, Old Lycoming, Limestone and other townships, particularly among on-lot wells. Woodward Township has expressed a concern with an inadequate water supply to fight fires in the village of Linden. The County has a standing Drought Task Force Committee that keeps precipitation and stream flow records, tests well water levels and advises municipalities of anticipated groundwater shortfalls. The Committee coordinates its efforts with those of the USGS, which maintains an on-going monitoring program and test well in the County, and the Susquehanna River Basin Commission (SRBC). Groundwater withdrawals of 100,000 gpd or greater are regulated by the SRBC. A map of generalized groundwater availability may be found in the County Comprehensive Plan and a more detailed discussion of the principle water-bearing formations in the County is presented in Chapter V of this Plan.

2. WATER QUALITY

Surface Water - The Pennsylvania Department of Environmental Protection has developed water quality standards for all surface waters in the Commonwealth. These standards, which are designed to safeguard the streams and lakes throughout Pennsylvania, include use designations (e.g., "cold water fishery," "warm water fishery," "swimmable") and the water quality criteria necessary to protect these uses. Special protection is provided for streams designated as "high quality waters" or "exceptional value waters." A substantial portion of the Appalachian Plateau in the northern half of the County has been designated exceptional value or high quality. Recently, Slate and Cedar runs have been upgraded from high quality to exceptional value. In addition, White Deer Hole Creek Watershed to the south is a high quality watershed.

Wastewater treatment plant effluent and any other discharges to streams classified as "high quality" are only permitted by the Department if the discharge is the result of necessary social and economic development, water quality standards are maintained and all existing uses of the stream are protected. This would have the effect of requiring any wastewater treatment plants in these areas to provide "tertiary" treatment to meet discharge criteria. Any

stream classified by the Department as "exceptional value waters" must be maintained at existing quality and may not be degraded, essentially precluding any point source discharge to the stream.

Surface water quality in the southern half of the County, including the Susquehanna River, is also generally good, with some residual acid mine drainage. A few small tributaries of Pine Creek, Little Pine Creek, and Lycoming Creek are polluted from acid coal mine drainage, some of which originates in Tioga County. Two unnamed tributaries to Larry's Creek also receive acid mine drainage from an inactive strip mine. Some County streams carry high coliform counts from malfunctioning on-lot septic systems, land application of manure, septage and sludge, and cattle with access to streams. Finally, streambank erosion and erosion from increased runoff due to impervious surfaces, driveways, and roads contributes sediment to streams. Acid rain deposition has adversely affected many Lycoming County streams.

Groundwater - Groundwater quality in Lycoming County is generally good in most undeveloped areas. However, contamination of private water wells from nitrate and coliform bacteria is widespread, which may be caused by pollution from intensive agriculture and/or on-lot septic systems, poor well construction, or use of unprotected spring sources for water supply. In addition, there have been several serious incidences of industrial contamination of groundwater within the County, some sites remaining contaminated. These sites cannot be sold because of the liability the contaminated water creates.

D. LAND USE IMPACTS ON WATER YIELD

The availability of water to meet future needs is greatly influenced by existing and potential future land uses throughout the County. In general, open land uses including wetlands, water bodies, forest, open space, and agriculture provide large pervious areas capable of absorbing enormous quantities of precipitation. Developed land uses, on the other hand, are characterized by impervious surfaces made of macadam or concrete, such as buildings, streets, parking lots, and sidewalks. Such uses create runoff into surface waters rather than replenish area aquifers.

1. EXISTING LAND USE

Lycoming County has a total land area of 777,920 acres, or 1215.5 square miles, sizable parts of which are held in large parcels and remain undeveloped. Developed areas include the City, boroughs and surrounding residential subdivisions. While the rate of development within the County in the last few decades has been fairly slow, there has been a substantial shift of population from Williamsport and the boroughs to the outlying suburban townships, mirroring similar trends nation-wide. A ring of growth has occurred within the rural townships beyond the suburban fringe, but still within commuting distance of employment centers. As this growth has occurred, wetlands, forests and agricultural lands have been developed and replaced by impervious surfaces.

2. SURFACE WATERS AND WETLANDS

Lycoming County has 2,200 miles of surface streams, many of them originating in the Appalachian Plateau to the north. Several reservoirs and lakes as well as a number of farm ponds dot the landscape. Surface water areas, including streams, lakes and ponds, act as water storage areas during floods and storms, and replenish underlying groundwater aquifers. The County has 4645 acres of wetlands (0.6% of the County).

Wetlands provide particular hydrologic benefits, doing more to safeguard both water quality and quantity than any other land use on an acre-for-acre basis. Wetlands, which include swamps, marshes, bogs, and similar areas, act as natural catchment basins during floods and storms by retaining excessive waters and gradually releasing them into the ground or nearby surface waterways. During dry seasons, wetlands also release waters to ground and surface sources, thus helping to maintain relatively stable flows during low flow periods. In addition, wetlands purify the quality of water by filtering and biodegrading pollutants.

While there is currently considerable debate as to exactly what constitutes a wetland, generally it must possess three components, including hydric soils, wetland vegetation and standing water during at least some part of the year. The National Wetlands Inventory, published by the U.S. Fish and Wildlife Service, identifies the County's major wetlands. In addition, hydric soils identified in the Lycoming County Soil Survey provide a good indication of many wetland locations in the County. There are 12, 613 acres of hydric soils within the County.

The proposed fill or encroachment of wetlands requires proper State and Federal permits. The Natural Resources Conservation Service administers the voluntary Federal Wetland Reserve Program, which provides incentives for the permanent protection of wetlands on private lands, and will shortly be administering the Wildlife Habitat Incentive Program, which will assist landowners in protecting wetlands as well as other wildlife habitats. The Fish and Wildlife Service together with the Natural Resources Conservation Service and the State Game Commission plus the Northcentral Pennsylvania Conservancy additionally work with landowners on a voluntary basis to restore wetland habitat through its Partners for Wildlife Program. The County and its municipalities are empowered to adopt other wetland protection measures to direct development away from these important areas and do have standards in zoning, subdivision and land development and other land use ordinances.

3. FOREST AND OPEN SPACE LANDS

Approximately 77% of the land area within Lycoming County is in forest cover, up from 69% in 1968. About half of this land has slopes of 15% and greater, primarily in the northern forested region, but also to the very south. Over one-third of the County's forest land lies within State Forests and Gamelands areas and is either protected from, or unlikely to be converted to, other uses. This land is managed for multiple-use purposes. Nearly two-thirds of the County's forest land is privately-owned woodland, including a few large commercial holdings and a number of game and hunting clubs. Much of the County's forest

land was cut near the turn of the last century and is now mature again. Most of the gain in acreage in forest land over the last few decades has been in privately-owned farmland or other rural lands which have been planted in or allowed to return to tree cover. There are several mills in the County, and as harvesting on state lands is limited there is pressure to cut on private lands. At the same time, there is increasing pressure to develop year-round and seasonal residences in areas adjacent to public forest land.

Forest and open space lands act to protect ground and surface water by providing large areas of pervious soils which recharge groundwater with minimal erosion and runoff and no significant degradation of water quality. Timber harvesting, and especially skidtrails and roads, and the development of forested lands, particularly those with steep slopes, results in siltation and erosion of streams, reduced groundwater recharge, increased storm water runoff and downstream flooding.

Proper development and woodland management are essential to maintaining the important natural processes that forest areas provide for our water resources. Most forested areas of the County permit very low density development of a minimum of five acres per lot, which will do much to protect water resources. Some of the County's townships have effective natural resource protection standards that apply to woodland areas but most do not. The County's Zoning Ordinance includes a variety of natural resource protection standards to guide and minimize the impacts of development in steep sloped areas, along streams, in woodlands and on ridges. These County standards, which apply to the 14 townships without their own zoning, should be duplicated and used by other municipalities.

The PA Bureau of Forestry offers technical assistance to woodland owners, including the Forest Stewardship Program, which provides cost sharing the development of forest management plans. The Cooperative Extension Service and the Lycoming County Woodland Owners Association are two other sources of information on sound woodland management practices.

Finally, the State's Clean and Green tax reduction program, which applies to forest and open space areas as well as to farms, allows landowners to apply for differential taxation of their property at use rather than assessed value in exchange for committing to not develop the major portion of their land for a period of seven years.

4. AGRICULTURAL LAND

As of 1997, 132,999 acres of land in Lycoming County were reported to be in farm use, representing about 17% of the County's total land area (1997 Census of Agriculture). Much of this land lies along or near the Susquehanna River in the southern half of the County. Dairy products account for about half of the County's agricultural cash receipts, totalling $43,191,000 in 1997, while meat and animal products account for about 19% and field crops 16%. Thirteen percent of the County's soils are considered to be prime. Such soils produce high yields with minimal inputs of energy and economic resources.

Current agricultural acreage within the County represents a decrease of 20,472 acres of farm land since 1990, a loss of nearly 3,000 acres per year to idling, abandonment or conversion to developed uses. This is a significantly accelerated rate of loss of land as compared to the period from 1972 to 1990, when a little over 1,000 acres of farm land a year were lost. This rate of conversion is unfortunately projected to continue because the County's farm belt lies in the path of development and is the planned location of a number of planned infrastructure improvements over the next decade or so.

The County's still significant areas of farmland allow large quantities of precipitation to infiltrate and recharge local groundwater supplies and so are important in this respect. A number of strategies have been developed within the County in recent years to attempt to stem the conversion of farmland to other uses. First, the County's Comprehensive Plan encourages townships to adopt effective agricultural zoning similar to the County's agricultural zone to protect a critical mass of farmland from conflicting adjacent uses. Second, enrollment in the County's Clean and Green tax reduction program is promoted. Third, exemption from local improvement assessments is encouraged, and fourth, enrollment in Agricultural Security Areas is recommended, qualifying landowners to sell their development rights if they choose.

As of 2001, farmers have enrolled large blocks of land totaling in excess of 60,000 acres in 21 townships in Agricultural Security Areas (ASAs) through the jointly–administered County-State Agricultural Preserve Program. An especially large concentration of agricultural security areas is located in the southeastern corner of the County. This voluntary program is intended to provide incentives to farmers to stay in farming. An ASA is an area of at least 250 acres of farmland identified by farm owners and township supervisors as being important to the future of local farming. Enrollment in an ASA provides three benefits: township supervisors agree not to pass laws which restrict normal farming operations; local condemnation abilities are limited; and enrolled farmers become eligible to apply to sell the development rights on their farms to the County, leading to the permanent preservation of the farm. ASAs encourage the continued farm use of properties by identifying and benefitting areas where farmers envision a long-term future for themselves. To date, 4,665 acres comprising 37 farms, have been preserved in perpetuity and 8 more are in various stages of approval. The County has invested $450,000, which has leveraged State investment of $3.5 million since the program started in 1990.

The State also sponsors a Farm Link program designed to help match farmers planning for retirement with young farmers wanting to farm.

5. BUILT LANDS

Built lands include residential, commercial, industrial, agribusiness, and institutional uses, as well as roads and parking lots. These uses involve impervious surfaces which reduce the infiltration of water into the ground after storm events. This in turn creates runoff and soil erosion, leading to the sedimentation and pollution of surface waters, downstream flooding, and reduced groundwater recharge. Where development occurs in steep-sloped areas or on

lands where vegetation has been removed, groundwater recharge especially is adversely impacted.

Recharge in developed and developing areas can be encouraged by limiting permitted lot coverage, promoting the use of pervious cover, requiring vegetative cover, and calling for the use of Best Management Practices in stormwater management.

Stormwater Planning - On October 4, 1978, the Pennsylvania General Assembly approved the Stormwater Management Act, P.L. 864, No. 167. Act 167 was adopted based on the Statewide recognition of the adverse effects of inadequate management of excessive rates and volumes of stormwater resulting from development. Act 167 requires all Pennsylvania counties to prepare and adopt stormwater management plans for each watershed located in the county. The plans are to provide for uniform standards and criteria throughout a watershed for the management, through implementation by local municipal ordinances, of stormwater volumes and flow rates from development sites through implementation by local municipal ordinances.

Lycoming County has adopted a Plan for the Chatham run watershed in western Lycoming County and Clinton County. A plan for the Grafius Run, McClures Run, and Millers Run watersheds has just been completed and adopted by the Commissioners and includes a model ordinance that could be used for other watersheds throughout the County. A small portion of Lycoming County within the Fishing Creek watershed is currently under study. The next planned study to be initiated in the spring of 2001 will be for Lycoming Creek. A number of other watersheds within the County are experiencing storm water management problems, some severe. These stormwater plans and the County's model ordinance encourage methods to increase groundwater recharge.

As regional stormwater plans are completed for each of the County's major watersheds, each municipality will be required to reassess the adequacy of its own stormwater management regulations in light of new watershed recommendations and make revisions where needed. Currently, most of the County's municipalities have stormwater management regulations included within local subdivision and land development ordinances or are among the 25 municipalities governed by the County's stormwater management standards. Clinton and Old Lycoming townships are examples of several communities with up-to-date and effective stormwater management provisions. However, many municipal regulations are minimal and need to be reassessed. Few include standards that apply to the development of homes on pre-existing lots.

Floodplain Protection - Floodplains are defined as those areas that are subject to periodic innundation by floodwaters. These areas must be kept free of development or fill to avoid an increase in flood heights and area innundated. The storage of hazardous materials within floodplains can also constitute a potential hazard. Extreme changes in slope in many areas of the County can cause sudden heavy rainfalls with resultant sudden changes in stream levels and flooding. One hundred-Year Floodplain areas in Lycoming County have been identified by the Federal Emergency Management Agency (FEMA) under the National Flood Insurance Program. The major flood potential areas are low lying and found along

major streams and the Susquehanna River. These areas total 34,000 acres. In addition, alluvial soils as identified in the County's Soil Survey may be used as a supplementary means of identifying areas subject to periodic innundation. Municipalities may choose to extend their areas of floodplain protection to include alluvial soils.

Identified floodplain areas are typically protected from fill development and encroachment activities through municipal floodplain zoning and/or subdivision regulations. All municipalities with identified floodplains within the County are subject to municipal or County floodplain regulations. However, most municipal regulations are not up-to-date and some are not administered effectively. Both legal and some illegal floodplain development continues to occur. Municipalities need to adopt and enforce floodplain regulations that limit development, establish setbacks and restrict vegetation removal. Lycoming County offers a program to train local officials in effectively administering floodplain programs. The County also participates in a FEMA buyout program in flood-prone areas, having as of 2000 purchased about 150 properties.

E. LAND USE IMPACTS ON WATER QUALITY

Water quality is affected by land uses and land use practices within the County in many ways. Direct sources of pollution enter the County's waters from specific points, such as industrial spills and leaks, underground storage tank leaks, sewage treatment plant discharge points, construction sites, surface mining, junkyards, and old dumps that predate the modern County landfill facility. This type of pollution can often be monitored and controlled where identified.

In contrast, indirect, or non-point pollution comes from many diverse sources and is more difficult to control. These sources include on-lot septic systems, certain agricultural practices, timber harvesting and associated activities, runoff from streets, improper disposal of household chemicals, use of lawn and garden products, and salts from winter road treatment. Studies report that up to 90% of all water pollution comes from non-point source pollutants.

Both point and non-point sources of water pollution contribute sediment, heavy metals, excess nutrients, bacterial pathogens, and organic chemical contaminants to ground and surface waters. Nutrient pollution, bacterial pathogens, heavy metals, and chemical contaminants have obvious direct human health implications, while sediment pollution and discharge of organic detritus jeopardizes water quality for municipal water treatment, fishing and recreational purposes. The following discussion analyzes the three major types of water pollution – erosion and sedimentation, biological pollution, and chemical pollution.

1. EROSION AND SEDIMENTATION

The removal of plant cover and various earth disturbance activities result in decreased infiltration and increased runoff of rainfall, which carries with it sediment caused by soil erosion. The primary contributors to sedimentation within the County include agriculture, forestry, construction, unpaved roads paralleling streams, and sand and gravel operations. Soil loss is greatest in areas with steep slopes and along streambanks.

Agricultural practices including the plowing of steep slopes, certain cultivation techniques, and an increasing tendency toward monoculture all increase soil loss through erosion. Streambank erosion occurs where riparian vegetation has been removed, where livestock are allowed access to streams and where overgrazing occurs. Forestry practices which promote soil loss include skidtrails, construction of logging roads and logging on steep slopes.

The Lycoming County Conservation District administers a number of programs designed to reduce erosion, including reviewing and approving Conservation Plans required of all farms. While some of Lycoming County farms have such plans, not all are up-to-date or implemented. The Natural Resources Conservation Service (NRCS) works with farmers to implement these plans. The Lycoming County Farm Service Agency administers the popular Conservation Reserve Program, which compensates farmers who remove highly erodable cropland from production.

The District also administers the State's Erosion and Sedimentation Control program , involving the review and approval of plans for earth-disturbing activities, including logging and construction, to assure minimal loss of soils. Together with the Cooperative Extension Service, the District also administers the Dirt and Gravel Roads program, intended to control erosion by working with municipalities in high quality and exceptional value watersheds. This program will probably soon be extended to other watersheds.

Finally, the District is involved with Endless Mountains Research Conservation and Development, DEP and the NRCS in establishing two watershed associations for Muncy and Loyalsock creeks. These new associations will be involved in watershed planning, including protection of water quality, over broad areas. These planning efforts should be coordinated with the County's stormwater planning work.

Municipalities can also significantly reduce the potential for sedimentation through the adoption and enforcement of effective stormwater management ordinances.

2. BIOLOGICAL POLLUTION

On-lot septic systems are a significant source of fecal coliform and fecal staphylococcus bacterial contamination of groundwater within the County. On-lot septic system malfunctions may or may not be noticeable to property owners. Many on-lot septic systems and cesspools were either improperly sited, have outlived their useful lives, are improperly utilized, or are not properly maintained. Even new properly functioning systems contribute

pollutants to the groundwater. Few municipalities require on-lot septic systems to be pumped out and maintained on a regular basis, and many older systems are located quite close to private and sometimes public wells.

The Natural Resources Conservation Service estimates that 93% of the soils within Lycoming County are not well suited for on-site sewage disposal, yet since 1980 there has been an increase in the proportion of County households using septic tanks for sewage disposal and drilled water for water supply.

Land application of manure, septage, and sludge can also contribute to bacterial contamination of groundwater, although DEP regulations on land disposal of sewage sludge and septage are among the best in the nation. However, the actual practice by haulers does not always comply with regulations.

3. CHEMICAL POLLUTION

Inorganic Pollution - Nutrients are inorganic chemicals which derive from human and animal wastes, such as nitrates, phosphates, and potassium. While nutrients are necessary for successful plant growth, an excess of them, particularly of nitrates and phosphates, can contribute seriously to water pollution. Sources of nutrient pollution within Lycoming County include on-lot septic systems, sanitary sewage and package treatment plants, combined sanitary and storm sewer systems, water treatment plants, inadequate barnyard drainage, inadequately constructed or maintained manure storage, unrestricted livestock access to streams, and the over-application of fertilizer, manure, sludge, and septage to land.

The application of nutrients to land, most often on farms, in excess of what can be taken up by plants either runs off over the land surface to nearby streams or infiltrates through soil and rocks to underlying groundwater, where they can accumulate in unacceptably high concentrations. Nitrates in groundwater are a particular problem; concentrations of over 10 milligrams per liter are a potential health hazard to unborn children, causing oxygen deprivation and resultant mental retardation. High levels of nitrates are also a potential health hazard for livestock, causing bovine infertility and low milk yields.

Phosphates are not as readily transmissible to groundwater because they are apt to bind with soil. For this reason, they tend to either remain in the soil or, where there is erosion and subsequent sedimentation in streams, contribute to the pollution of surface waters.

The recent passage of the Pennsylvania Nutrient Management Act requires farmers with more than 2,000 pounds of animal weight per acre available for manure application to develop a plan for managing nutrients to assure that only as much manure is land-applied as can be utilized by crops. A small percentage of Lycoming County farmers are required to develop such plans. The County Conservation District is responsible for administering this program in the County. In addition, the District is involved in nutrient management efforts through long-standing Chesapeake Bay programs. Finally, the District in partnership with the NRCS provides limited assistance to landowners willing to restrict livestock access to streams through DEP's Stream Bank Fencing program.

The presence of porous carbonate geology within the County, particularly in agricultural areas, presents another potential contaminant hazard as fractures and solution channels within the rock can permit the influx of sewage and surface wastes. The sinkholes that also occur in such geology can act as direct conduits for contaminants to enter the groundwater.

Organic Pollution - Commercial, industrial and institutional activities can be sources of leaks, spills, outfalls and dumps which can contribute contaminants to streams and groundwater. Spills occur primarily when vehicles in transit are involved in accidents and release hazardous substances. A major potential source of groundwater contamination is leaking underground storage tanks, which often go unnoticed until nearby wells are contaminated. Older gasoline tanks are a primary source of such leakage. Federal standards now require the approval of new and inspection of existing underground storage tanks. Gas and oil exploration has been on the increase in the County and there is concern about the potential for brine contamination of water sources.

Pesticides (including insecticides, herbicides and fungicides), even in small concentrations, can be a public health concern when they enter groundwater and streams. Pesticides, like phosphates, tend to bind with soil and are more likely to find their way into streams and lakes through sediment transport and erosion than they are likely to enter groundwater. Pesticides are used by homeowners, businesses, institutions, and farmers. A particularly heavy user of pesticides is golf courses, which typically use far greater amounts of pesticides per acre than any other use. In response to growing concerns, the U.S. Golf Association has recently adopted a number of initiatives to reduce pesticide use and the impact it may have on surface and groundwater. Another heavy user of pesticides is the orchard industry. Landowners interested in utilizing an Integrated Pest Management approach to reducing the use of pesticides can receive assistance from the County's Cooperative Extension Service.

Polluted urban and suburban runoff is created when stormwater in developed areas washes contaminants off roads and lawns into streams and lakes. Such contaminants include motor vehicle oil, gasoline, volatile organic compounds, and antifreeze; lawn garden fertilizers and pesticides; salts from winter road treatment and other pollutants. Water quality problems caused by urban-suburban runoff are difficult to control after development has occurred. Stormwater management regulations which apply to new development can greatly reduce stormwater flows, thereby reducing water quality problems caused by urban and suburban runoff.

F. ECONOMIC CONDITIONS

Historically, Lycoming County’s economy was based primarily on agriculture, forestry and mining. Today the County has a diverse economy centered on the production of a variety of goods and services.

1. ECONOMIC SECTORS

The table below identifies the County's major economic sectors, number of establishments, number of employees and payroll for 1997. Almost one-third of the County's workforce is engaged in the production of goods, as compared with one-quarter of the State's workforce so engaged. Prominent sectors include the manufacturing of both durable and non-durable goods.

Table 1
Lycoming County Employees By Major Industry: 1997
County Water Supply Plan
Lycoming County Planning Commission

Major Industry	Number of Establishments	Number of Employees	Payroll ($1,000)
Agriculture, Forestry, and Fishing	33	128	2,606
Mining	7	149	5,603
Construction	260	1,926	50,525
Manufacturing	214	12,372	356,029
Transportation and Public Utilities	128	1,920	53,319
Wholesale Trade	183	2,545	59,991
Retail Trade	843	10,636	132,400
Finance, Insurance and Real Estate	237	2,147	61,144
Services	967	15,167	314,854
Unclassified	10	2	116
TOTAL	**2,882**	**46,992**	**1,036,587**

Source: County Business Patterns, U.S. Bureau of the Census

Note: Because the above figures do not include the self-employed, those individuals and the payroll or income involved in agriculture are undercounted.

2. EMPLOYMENT TRENDS

Most recent growth in employment within the County has been in the service sector, paralleling State and national trends, and is expected to continue. A number of the County's major industries continue to be resource-based, creating a comparative advantage for several types of high value added industry groups desiring to locate or expand in Lycoming County. These include Food and Kindred Products, Apparel and other Textiles, Lumber and Wood Products, Furniture and Fixtures, Paper and Allied Products, Plastics and Printing and Publishing. The County may also be able to attract high-tech industry as it improves its infrastructure and transportation network.

3. EXISTING AND FUTURE WATER NEEDS

Current high water users within Lycoming County include area hospitals, golf courses, prisons, two colleges, food processors and bottlers, plastics manufacturers and several industrial operations that involve cooling. It is projected that the demand for water by existing and new businesses will continue to grow, although potential changes in the efficiency of industrial water use, including conservation practices, could also affect water use. Potential future businesses which are likely to locate in Lycoming County include those which are similar to existing uses, including spin-off businesses as well as expansions of existing businesses. Some of these uses, including those noted above, can be highly water-consumptive.

The availability of public water together with other public utilities and services can have a significant impact on the willingness of industry and business to locate within an area. Industry is often reluctant to utilize groundwater because of its variability in quality – particularly where food processing or pharmaceuticals is involved – and potential fluctuations in supply at certain times of the year. Public water systems supply a more consistent source of reliable water quality and quantity. In several instances in the past, the inability of potential incoming industry to locate suitable sites with adequate public water has been an impediment to economic development. It is important that sufficient public water be made available to sites designated as otherwise appropriate for and suited to economic development.

G. POPULATION ANALYSIS

An analysis of historic growth trends and projected population growth is essential to planning for future land uses and determining the types and levels of community services that will be needed. A knowledge of likely future growth areas and growth levels will enable both municipalities and existing and prospective community water suppliers to be prepared to meet future water needs.

1. HISTORIC POPULATION GROWTH

Lycoming County's population grew by 17% in the 40 years between 1950 and 1990, averaging 4.25% growth per decade (U.S. Bureau of Census). However, most of this reported growth occurred before 1980, with a leveling-off in the '80s, due primarily to net out-migration. In addition to the movement of residents outside the County, there was also a substantial shift in the County's population within its boundaries from urban to rural areas. The net result has been a significant loss in population in Williamsport and most of the County's boroughs, paralleling state and national trends in many other communities.

The County Planning Commission believes that the reported 1990 municipal population figures underestimate the County's likely actual population by significantly underreporting addressed structures as recorded by the County Assessor. While the number of residences within the County cannot be precisely disaggregated from the industrial, commercial and institutional uses that are included among these numbers, especially at the municipal level, some generalizations can be made. While there are 57,032 addressed structures within the County in 1999, only 49,580 housing units were reported in 1990. Estimating that 2,849 of these structures represent industrial, commercial and institutional establishments (not including Agricultural, Forestry and Fishing) in 1997 (see Table 1), this leaves 4,603 unaccounted-for structures, which are likely to be some combination of uncounted full-time and seasonal residences.

The County believes that, in part because of this apparent undercount, the U.S. Census Bureau has estimated 1998 populations for the County's municipalities which total a lower figure -117,308 – than that for 1990 - 118,710. The County believes that it is important to attempt to correct for this error in devising a methodology for projecting future population estimates. For this reason, the estimated 1998 population is not used in this analysis. Instead, original 1990 estimates for the County's municipalities have been developed. First, "unadjusted" 2000 estimates were derived, based on historic average per decade growth rates from 1950 to 1990 (see Table 2), including a few corrections for historical very high per decade growth rates. These estimates were then "adjusted" for a variety of factors, including infrastructure capabilities and development potential, to more realistic likely year 2000 populations (see Tables 3 and 4). These adjusted 2000 estimates were then used as baseline data, from which year 2010 and 2020 projections were made considering the same historic growth trends and municipal-specific adjustment factors. The County estimates that the adjusted 2000 estimates for its municipalities totals 133,739.

2. POPULATION PROJECTIONS

Year 2010 and 2020 population projections have been developed for each of Lycoming County's 52 municipalities in a four-step process based on a variety of relevant considerations. The average per decade growth rate for the period from 1950 to 1990 was used as the primary basis for the projections. In the first step, the adjusted municipal 2000 population estimates were geometrically extrapolated based on the average historic per decade growth rate to 2010 to yield unadjusted populations (see Table 4).

Table 2
Population Profile
County Water Supply Plan
Lycoming County Planning Commission

Municipality	1950 Population	1960 Population	1970 Population	1980 Population	1990 Population	Growth Rate per Decade (1950-1990)	Unadjusted Estimated 2000 Population (1)
City and Boroughs							
Duboistown	1140	1358	1468	1218	1201	2.2%	1227
Hughesville	2095	2218	2249	2174	2049	-0.5%	2039
Jersey Shore	5595	5613	5322	4631	4353	-6.0%	4092
Montgomery	2166	2150	1902	1653	1631	-6.7%	1522
Mountoursville	3293	5211	5985	5403	4983	-0.9%	4938*
Muncy	2756	2830	2872	2700	2702	-0.4%	2691
Picture Rocks	569	594	570	615	660	3.9%	686
Salladasburg	250	255	239	273	301	5.1%	316
S.Williamsport	6364	6972	7153	6581	6496	0.7%	6541
Williamsport	45,047	41,967	37,918	33,401	31,933	-8.2%	29,314
City/Borough Totals	**69,275**	**69,168**	**65,678**	**58,649**	**56,309**	**-5.0%**	**53,366**
Townships							
Anthony	433	445	480	730	727	15.6%	840
Armstrong	553	606	727	724	676	5.6%	714
Bastress	275	321	441	500	513	17.5%	603
Brady	192	431	255	804	822	75.3%	1441**
Brown	153	96	119	84	102	-5.3%	97
Cascade	185	168	219	364	382	23.1%	470
Clinton	1917	1976	1934	2467	3086	13.4%	3500
Cogan House	610	633	521	819	807	10.8%	894
Cummings	160	148	321	369	334	28.7%	430***
Eldred	639	701	1066	1771	2055	36.0%	2795**
Fairfield	466	869	1420	2291	2580	56.0%	4025**
Franklin	653	681	645	819	914	9.4%	1000
Gamble	367	394	461	676	744	20.3%	895
Hepburn	849	1315	1623	2534	2834	36.6%	3871**
Jackson	286	310	352	449	421	10.8%	466
Jordan	573	606	663	822	871	10.1%	959
Lewis	688	752	750	1149	1194	16.5%	1391
Limestone	988	944	1168	1839	1893	19.9%	2270
Loyalsock	5535	9047	10,581	10,763	10,644	20.2%	12,794
Lycoming	720	1196	1507	1902	1748	29.6%	2265**
McHenry	227	147	241	204	246	8.5%	267
McIntyre	649	529	720	698	588	-0.3%	586
McNett	241	207	192	235	200	-3.5%	193
Mifflin	492	513	688	985	1110	23.6%	1372
Mill Creek	231	225	265	417	477	21.7%	581
Moreland	570	576	621	868	984	15.5%	1137
Muncy	819	907	880	1051	1036	6.4%	1102
Muncy Creek	1646	2070	2473	3427	3401	20.8%	4108
Nipppenose	497	540	583	714	742	10.8%	822
Old Lycoming	2988	3996	4616	5220	5526	17.0%	6465
Penn	507	546	513	739	788	13.1%	891
Piatt	539	689	1013	1059	1097	20.7%	1324
Pine	336	272	321	312	290	-2.7%	282
Plunketts Creek	427	592	692	710	905	21.4%	1099
Porter	1162	1234	1283	1541	1441	5.9%	1526
Shrewsbury	331	347	406	436	402	5.4%	424
Susquehanna	569	803	1046	1099	1046	17.9%	1233
Upper Fairfield	611	873	1174	1761	1774	25.6%	2228
Washington	702	728	860	1368	1552	23.6%	1918
Watson	239	226	291	530	565	28.0%	723***
Wolf	727	957	1473	2147	2617	33.6%	3496**
Woodward	1222	1583	2014	2370	2267	17.5%	2664
Township Totals	**31,974**	**40,199**	**47,618**	**59,767**	**62,401**	**18.5%**	**76,161**
County Totals	**101,249**	**109,367**	**113,296**	**118,416**	**118,710**	**4.1%**	**129,527**

(1) Based on average per decade growth 1950-1990

* 1950-1960 decade omitted from calculation due to anomaly of 58.2% growth in this time period

** The projected future growth rates for these townships, as employed in Table 4, were reduced to 25% per decade after 2000 because higher rates are seldom sustained over any extended length of time

*** The projected future growth rates for these townships, as employed in Table 4, were reduced to 10% Per decade after 2000 because extensive State Forest areas and floodplains make historic high Growth rates unsustainable over time

Sources: U.S. Census Bureau

Table 3
Population Adjustment Factors
County Water Supply Plan
Lycoming County Planning Commission

Municipality	Infrastructure (1)			Development Potential		
	Community Water (2)	Community Sewer (2)	Major Transport Route	City/Borough Infill (3)	Seasonal Dwellings (4)	Development Factor (5)
City and Boroughs						
Duboistown				X		2%
Hughesville				X		2%
Jersey Shore				X		3%
Montgomery				X		2%
Mountoursville						0%
Muncy				X		2%
Picture Rocks						0%
Salladasburg						0%
S.Williamsport				X		2%
Williamsport				X		4%
City/Borough Totals	–	–	–	**7**	–	–
Townships						
Anthony						0%
Armstrong		X	X			4%
Bastress						0%
Brady	X		X			4%
Brown					X	2%
Cascade					X	2%
Clinton	X	X	X			6%
Cogan House			X		X	4%
Cummings						0%
Eldred						0%
Fairfield		X	X			4%
Franklin						0%
Gamble						0%
Hepburn			X			2%
Jackson			X			2%
Jordan						0%
Lewis			X			2%
Limestone						0%
Loyalsock	X	X	X			6%
Lycoming		X	X			4%
McHenry					X	2%
McIntyre					X	2%
McNett					X	2%
Mifflin	X					2%
Mill Creek					X	2%
Moreland						0%
Muncy	X	X	X			6%
Muncy Creek	X	X	X			6%
Nipppenose						0%
Old Lycoming	X	X	X			6%
Penn			X			2%
Piatt			X			2%
Pine					X	2%
Plunketts Creek					X	2%
Porter			X			2%
Shrewsbury			X		X	4%
Susquehanna						0%
Upper Fairfield						0%
Washington						0%
Watson						0%
Wolf	X	X	X			6%
Woodward		X	X			4%
Township Totals	**8**	**10**	**19**	-	**12**	-
County Totals	**8**	**10**	**19**	**7**	**12**	-

(1) townships only
(2) serving 1000+ persons
(3) based on estimated potential conversions and infill of vacant land; infill potential is greater for Jersey Shore and Williamsport
(4) based on estimated conversion of seasonal dwellings to permanent dwellings
(5) 2% per factor applicable, except City/Borough Infill for Jersey Shore (3%) and Williamsport (4%)

Table 4
Adjusted Population Projections
County Water Supply Plan
Lycoming County Planning Commission

Municipality	Development Factor	Adjusted Estimated 2000 Population (1)	Year 2010 Projections		Year 2020 Projections	
			Unadjusted (2)	Adjusted (3)	Unadjusted (4)	Adjusted (5)
CITY AND BOROUGHS						
Duboistown	2%	1252	1280	1306	1335	1362
Hughesville	2%	2080	2070	2111	2100	2142
Jersey Shore	3%	4215	3962	4081	3836	3951
Montgomery	2%	1552	1448	1477	1378	1406
Mountoursville	0%	4938	4893	4893	4849	4849
Muncy	2%	2705	2694	2748	2737	2792
Picture Rocks	0%	686	713	713	741	741
Salladasburg	0%	316	332	332	349	349
S.Williamsport	2%	6672	6719	6853	6901	7039
Williamsport	4%	30,487	27,987	29,106	26,719	27,788
City/Borough Totals		**54,903**	**52,098**	**53,620**	**50,945**	**52,419**
TOWNSHIPS						
Anthony	0%	840	971	971	1122	1122
Armstrong	4%	743	785	816	862	896
Bastress	0%	603	709	709	833	833
Brady	4%	1499	1874	1949	2436	2533
Brown	2%	99	94	96	94	96
Cascade	2%	479	590	602	741	756
Clinton	6%	3710	4207	4459	5057	5360
Cogan House	4%	930	1030	1071	1187	1234
Cummings	0%	430	473	473	520	520
Eldred	0%	2795	3494	3494	4368	4368
Fairfield	4%	4186	5233	5442	6803	7075
Franklin	0%	1000	1094	1094	1197	1197
Gamble	0%	895	1077	1077	1296	1296
Hepburn	2%	3948	4935	5034	6293	6419
Jackson	2%	475	526	537	595	607
Jordan	0%	959	1056	1056	1163	1163
Lewis	2%	1419	1653	1686	1964	2003
Limestone	0%	2270	2722	2722	3264	3264
Loyalsock	6%	13,562	16,302	17,280	20,771	22,017
Lycoming	4%	2356	2945	3063	3829	3982
McHenry	2%	272	295	301	327	334
McIntyre	2%	598	596	608	606	618
McNett	2%	197	190	194	187	191
Mifflin	2%	1399	1729	1764	2180	2224
Mill Creek	2%	593	722	736	896	914
Moreland	0%	1137	1313	1313	1517	1517
Muncy	6%	1168	1243	1318	1402	1486
Muncy Creek	6%	4354	5260	5576	6736	7140
Nipppenose	0%	822	911	911	1009	1009
Old Lycoming	6%	6853	8018	8500	9945	10,542
Penn	2%	909	1028	1049	1186	1210
Piatt	2%	1350	1629	1662	2006	2042
Pine	2%	288	280	286	278	284
Plunketts Creek	2%	1121	1361	1388	1685	1719
Porter	2%	1557	1649	1682	1781	1817
Shrewsbury	4%	441	465	484	510	530
Susquehanna	0%	1233	1454	1454	1714	1714
Upper Fairfield	0%	2228	2798	2798	3514	3514
Washington	0%	1918	2371	2371	2931	2931
Watson	0%	723	795	795	875	875
Wolf	6%	3706	4633	4911	6139	6507
Woodward	4%	2771	3256	3386	3979	4138
Township Totals	–	**78,836**	**93,766**	**97,118**	**115,798**	**119,997**
County Totals	–	**133,739**	**145,864**	**150,738**	**166,743**	**172,416**

(1) based on Unadjusted Estimated 2000 Populations x Development Factor
(2) based on Adjusted Estimated 2000 Populations x Average Growth Rate per Decade (1950-1990)
(3) based on Unadjusted 2010 Projections x Development Factor
(4) based on Adjusted 2010 Projections x Average Growth Rate per Decade (1950-1990)
(5) based on Unadjusted 2020 Projections x Development Factor

In the second step, the unadjusted populations were adjusted to provide 2010 projections that reflect specific municipal infrastructure capabilities and development potential (see Table 3). This was felt to provide a more tailored and forward-looking approach to likely future growth rather than relying exclusively on past growth trends.

Infrastructure capabilities include availability of significant community water or community sewer and major transport routes. Infrastructure capabilities were noted only for townships as it was felt that only in townships do these factors have growth-inducing impacts. Development potential includes conversion and infill potential within the City and boroughs and potential for conversion of seasonal residences to full-time residents within townships.

Each of the five infrastructure and development considerations can receive zero or two points each, with the exception of infill potential within the City or boroughs, which can receive from two to four points. The City and boroughs can receive up to four points each, while townships can receive up eight points each (though none receives more than six). These points translate to percent increase (or decrease) in growth the County believes is likely to occur over unadjusted projections. The adjusted 2000 population estimates as well as the 2010 and 2020 population projections are based on this added potential for growth.

In the third step, the adjusted 2010 population projections are geometrically extrapolated based on average per decade growth rates for 1950 to 1990 to yield unadjusted 2020 projections, as in step one. In the fourth step, the unadjusted 2020 projections are adjusted based on the factors described above to yield adjusted 2020 projections, as in step three.

The County's adjusted 2020 population projection is 172,416. This figure includes a projected 52,419 for the City and boroughs, which reflects a nearly five percent projected loss over the next 20 years from 2000 population estimates. This projected loss is less than half the historic average per-decade population loss in these municipalities since 1950 and reflects an anticipated stabilization of population.

Township populations are projected to increase to 119,997 in 2020 from the 2000 estimate of 78,836, reflecting a 52% growth rate over the next 20 years. This projected gain is about half again as high as the historic average per-decade population gain in these municipalities since 1950 and reflects both increased growth in response to adjustment factors and an accounting for the 1990 undercount of population.

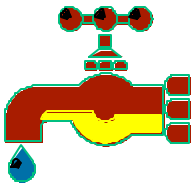
Several of the County's townships have a high concentration of seasonal and recreational dwelling units. While the temporary residents of such housing are not counted in Lycoming County's population counts, their need for water is real. In 1990 there were 2767 reported seasonal dwellings in the County, most of them within 12 townships in the northern part of the County. As noted in a preceding discussion, this figure may represent an undercount. The future need for water – primarily groundwater from private wells - for current and projected future seasonal residents is in addition to that needed for the County's future permanent population. The County's seasonal population is projected to continue to grow to the year 2020; however, the likely low densities and remoteness of new development are unlikely to necessitate the provision of public water.

3. FUTURE WATER NEEDS

The adjusted 2020 municipal population projections will be used as the bases for projecting future residential water needs in Chapter II of this plan. Both the size and distribution of planned population growth have important impacts on the need for and utilization of water resources. Planned and compact future growth areas will enable the cost-effective provision of public water and other services to the maximum possible number of people, while protecting water quality.

Lycoming County is currently in the process of developing Phase 2 of its Comprehensive Plan. This plan will make recommendations for future growth areas that could be most efficiently served by existing and planned public utilities and services. The development of this Water Supply Plan provides an opportunity for the County and water purveyors to coordinate these two important and interrelated planning processes. Municipalities and water suppliers should likewise work together to coordinate planned growth and future water service areas.

II. COMMUNITY WATER SYSTEM INVENTORY



A. INTRODUCTION

Water is provided to Lycoming County residents and businesses by community, noncommunity and on-lot water systems. Public water systems, including both community and noncommunity systems, are systems that provide water to the public for human consumption and have at least 15 service connections or regularly serve an average of at least 25 individuals daily at least 60 days out of the year. A community water system (CWS) is a system that regularly serves at least 15 connections used by year-round residents or regularly serves at least 25 year-round residents. Normally, community water systems serve entire communities, as well as larger residential developments, mobile home parks and resident institutional uses.

Noncommunity water systems (NCWSs) serve non-residential populations, including commercial, industrial, institutional, and seasonal uses with 25 or more individuals, while on-lot water systems serve individual residences and other uses with fewer than 25 persons.

This chapter provides detailed inventory information for each of the County's community water systems, while presenting more general data on noncommunity and individual on-lot water systems to contribute to a clearer picture of Countywide water use. Summary sheets for each of the County's community water systems relaying information about each system's primary components, existing capabilities, and future needs are included in Appendix A of this report. A map of water systems in the County is provided in the map pocket at the back of this report.

B. COMMUNITY WATER SYSTEMS

Thirty-seven community water systems currently provide water to Lycoming County residents. All of these systems own and operate their own sources of supply and treatment and distribution facilities, providing water directly to users. DEP is currently investigating three water systems in the County that may also be community water systems. If determined to be community water systems, they should be considered in future updates of the County Water Supply Plan.

The data presented in this section are drawn primarily from the PA Drinking Water Information System (PADWIS) database, which is based largely on Community Water System Inventories updated regularly by the DEP. Also utilized are the 1999 Annual Water Supply Reports (AWSRs) (and some 1998 reports where current reports are lacking) provided by water suppliers to the DEP, and responses to a water system survey (Appendix B) developed for this study and distributed to each community water system.

Twenty-three of the 37 inventories distributed to CWSs and seven inventories distributed to NCWSs were returned by the County's community water systems, for a 62% response rate by CWSs.

1. WATER SOURCES

The County's community water systems utilize a total of 79 wells, four streams and three springs. Table 5 summarizes the number and type of water sources in use for each system, as well as safe yield. Safe yield is used as a conservative estimate of year-round groundwater availability and is defined by the DEP as the maximum quantity of water that can be drawn from surface or groundwater sources without ultimate depletion of the source during a drought interval of 50 years. While some safe yield data is based on recent testing, other data is based on estimates or older figures. While more recent safe yield data tends to account for the cumulative interactions and drawdown of multiple, adjacent water sources, older safe yield data does not. Hence, safe yield data is approximate and not exact. Reported safe yields for the County's community water systems total 22.268 mgd; safe yield for one system is unknown.

2. WATER USE

Table 5 reveals that in 1999, Lycoming County community water systems provided approximately 9.932 mgd in average daily water to County residents as compared with estimated peak daily water use for the year of 13.309 mgd. The County's community water systems serve a reported population of 74,632, approximately 56% of the County's estimated 2000 population of 133,739. However, the actual proportion served is probably somewhat higher. This is primarily because multi-family units are unreported for some systems (see section E – On-lot Water Wells).

Thirty-seven CWSs provide water for residential purposes totalling 4.488 mgd. Ten CWSs provide water for commercial, industrial, institutional, bulk sales and other uses totalling 3.235. "Other" water uses typically include plant flushing and municipal use. Seven CWSs report unaccounted-for water totalling 2.189 mgd. "Unaccounted-for water" primarily includes primarily leakage and occasional fire fighting.

The final columns of Table 5 calculate average and peak daily 1999 water use per person for residential purposes for each system. Although the Allenwood Federal prison Camp and Muncy State Correctional Institute are considered to serve residential populations, their much higher water use figures are not included in this discussion nor in the calculation of average residential per person water use County-wide. Average per-person residential water use figures for the County's other 35 CWSs range from a low of 31 gpd to a high of 165 gpd, both in systems run by authorities. Average residential water use per person is 64 gpd, slightly over DEP's general estimate for average water demand per person.

Table 5
Community Water System Inventory
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	PWS ID (1)	Area Served	Water Source		1999 Water Use (gpd)					Population	Avg. Res. Water Use per Person (gpd)	Peak Res. Water Use per Person (gpd)
			Type	Safe Yield (gpd)	Residential	Non-residential (2)	Unaccounted for (%) (3)	Total Average	Total Peak			
ABC #2 MHP	10	Lycoming Twp.	1 well	36,000	5,000e			5,000e	UNK	75	67	UNK
Allenwood Fed. Prison Camp	163	Brady Twp.	1 well	223,900	152,504			152,504	275,300	725	210*	378*
American Tempo Village Park	2	Hepburn Twp.	1 well	8,700	3,624			3,624	5,690	75	48	76
Barto's Trailer Court	155	Wolf Twp.	1 well	20,000	5,370			5,370	6,122	63	85	97
Bittner's MHP	16	Lewis Twp.	1 well	50,000	4,603			4,603	7,400	90	51	82
Carpenters MHP	31	Woodward Twp.	2 wells	63,000	4,806			4,806	9,840	125	38	79
Cogan Valley MHP	152	Hepburn Twp.	2 wells	102,000	9,241			9,241	17,000	160	58	106
Collomsville Mutual Waterworks	179	Limestone Twp.	1 well	30,000	29,000			29,000	35,000	250	116	140
Fairlawn Trailer Court	7	Lycoming Twp.	1 well	32,000	3,000			3,000	4,700	63	48	75
Foxcroft Manor MHP	166	Muncy Creek Twp.	2 wells	36,000	15,000			15,000	UNK	200	75	UNK
Harvest Moon Trailer Court	30	Woodward Twp.	5 wells	32,000	22,000			22,000	28,000	380	58	74
Heatherbrooke Estates MHP	5	Muncy Creek Twp.	2 wells	72,000	9,104			9,104	24,000	172	53	140
Hidden Valley MHC	160	Woodward Twp.	1 well	6,000	4,000			4,000	7,000	35	114	200
Hughesville Boro Water Auth.	178	Hughesville Boro, Wolf Twp.	2 wells	1,440,000	394,281	91,437	18,150 (4%)	503,868	712,000	2,387	165	252
Jersey Shore Area Joint Water Auth.	156	Jersey Shore & Salladasburg Boros, Porter, Mifflin, Nippenose, Piatt & Anthony Twps	1 well, 2 streams	2,410,000	347,544	367,131	122,172 (15%)	836,847	939,000	6,171	56	73
Limestone Twp. Water Auth.	180	Limestone Twp.	2 wells, 1 stream	100,000	40,827	12,600	76,007 (59%)	129,434	159,000	710	58	99
Loyalsock MHP	25	Upper Fairfield Twp.	1 well	10,000	5,041			5,041	6,560	91	55	72
Meadowbrook MHP	154	Muncy Creek Twp.	3 wells	43,200	7,878			7,878	16,000	216	36	74
Montgomery Boro W & S Auth.	161	Montgomery Boro., Clinton Twp.	3 wells	953,000	113,107	67,288	23,506 (12%)	203,901	425,890	1,968	57	101
Montoursville Boro Waterworks	175	Montoursville Boro. Fairfield Twp.	5 wells	1,500,000	275,755	233,851	202,090 (28%)	711,696	1,223,000	4,983	55	158
Mountain Laurel MHP	20	Armstrong Twp.	2 wells	44,000	5,000			5,000	UNK	74	68	UNK

Table 5
Community Water System Inventory
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	PWS ID (1)	Area Served	Water Source		1999 Water Use (gpd)					Population	Avg. Res. Water Use per Person (gpd)	Peak Res. Water Use per Person (gpd)
			Type	Safe Yield (gpd)	Residential	Non-residential (2)	Unaccounted for (%) (3)	Total Average	Total Peak			
Muncy Boro Water Department	165	Muncy Boro., Muncy Creek Twp.	4 wells	1,286,000	178,718	182,273	129,803 (26%)	490,794	694,014	3,237	55	118
Muncy State Correctional Inst.	176	Clinton Twp.	2 wells, 3 springs	643,600	145,233			145,233	177,000	1,200	121*	148*
Oak-Lynn Manor MHP	153	Wolf Twp.	1 well	35,000	15,000			15,000	16,700	250	60	67
Orchard MHP	27	Wolf Twp.	2 wells	251,000	27,500			27,500	30,000	293	94	102
Pinecrest Village MHP	19	Eldred Twp.	5 wells	UNK	7,738			7,738	11,500	180	43	64
Pleasant Pines MHP	168	Muncy Creek Twp.	1 well	7000	2,625			2,625	4,000	49	54	82
Ralston Area Joint Auth.	171	McIntyre Twp.	2 wells	73,000	13861e	736e		14,597	UNK	450	31	UNK
Roaring Branch Waterworks	182	(Union Twp.), McNett Twp.	1 well	15,840	8,536			8,536	11,300	92	93	123
Tiadaghton View MHP	164	Upper Fairfield Twp.	3 wells	68,000	6,000			6,000	11,000	91	66	121
Timberend Estates MHP	34	Fairfield Twp.	2 wells	47,000	23,862			23,862	37,000	360	66	103
Twin Hills MHP	33	Fairfield Twp.	2 wells	50,000	17,740			17,740	40,000	372	48	108
Vali-View MHP	169	Fairfield Twp.	1 well	30,000	8,500			8,500	10,000	150	57	67
Village Water Incorporated	174	Fairfield Twp.	2 wells	252,000	14,411	4,537		18,948	55,700	378	38	135
Waterville Water Association	187	Cummings Twp.	1 well	24,480	10,042	1,065		11,107	18,500	182	55	96
Wilawan MHP	289	Lewis Twp.	1 well	73,000	4,804			4,804	10,038	72	67	139
Williamsport Mun. Water Auth.	173	City of Williamsport, S. Williamsport & DuBoistown Boros, Loyalsock, Old Lycoming & Armstrong Twps	9 wells, 2 streams	12,200,000	2,566,521	2,273,853	1,617,711 (25%)	6,458,085	8,281,000	48,363	53	91
County Totals			**79 wells, 4 streams, 3 springs**	**22.268 mgd**	**4.488 mgd**	**3.235 mgd**	**2.189 mgd**	**9.932 mgd**	**13.309 mgd**	**74,632***	**64**	**107**

(1) Last two digits of Public Water System identification number
(2) Includes commercial, industrial, institutional, bulk and other
(3) Includes water lost to leakage and fire fighting
e = estimate
* = less 1925 persons in institutions yields 72,707 persons
UNK = unknown
* = Not included in County totals

Peak figures range from a low of 67 gpd in two mobile home parks to a high of 252 pgd in a system run by an authority. Some of the lower water use figures may be unreliable because some systems lack individual meters or do not take daily meter readings, resulting in inaccurate water estimates, or because of overestimates of populations served. Some of the higher water use figures may be due in part to unreported system leakage, breaks, fires, and other unaccounted for but unreported water use.

3. PUMPING AND TRANSMISSION

Source pumping and transmission capacities are reflected in Table 6. Source pumping capacity for the County's CWSs totals 39.908 mgd, including three systems with unknown pumping capacities. Transmission pumping capacity Countywide totals 18.876 mgd, including 14 systems with unknown pumping capacities and five with gravity systems not requiring pumping. Additional transmission and distribution data are presented in Chapter IV.

4. WATER TREATMENT

A summary of water treatment is provided in Table 6. All of the County's CWSs provide for disinfection. Six systems provide full water filtration. Twenty-eight systems provide corrosion control, eight provide particulate removal, seven provide iron removal, five provide manganese removal, three provide taste or odor control, and one system each treats for removal of organics or inorganics. Water treatment and Safe Drinking Water Act requirements are further discussed in Chapter III.

5. WATER STORAGE

Raw and finished, or treated, water storage within Lycoming County is identified in Table 6. Thirty-three of the County's community water systems provide some type of finished storage, while two provide none, and no data is available on another two. Total finished water storage capacity for the County is 22.914 million gallons. Raw water storage totalling 1.0838 billion gallons is provided by 10 systems.

6. ORGANIZATIONAL STRUCTURE

The organizational structure of each water system is set forth in Table 7. There are a variety of ownership types within the County, including three municipal systems, five authorities, three water associations, 23 mobile home parks, one investor-owned system, one federal system and one state system. State law requires that the Pennsylvania Public Utilities Commission (PUC) regulate all investor-owned systems. Of the County's 37 CWSs, none is interconnected with another system. Three systems indicate on the survey that they utilize some form of joint cooperation, management or procurement.

Table 6
Community Water System Structural Components
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	PWS ID (1)	Source Pumping Capacity (gpd)	Transmission Capacity (gpd)/ # pumps	Treatment Process			Storage (gal)	
				Objective (2)	Filtration	Capacity (gpd)	Raw	Finished
ABC #2 MHP	10	unknown	UNK (1)	D	NO	NA		3400
Allenwood Fed. Prison Camp	163	369,000	369,000 (2)	D	NO	NA		1,250,000
American Tempo Village Park	2	32,000	NA	D,T	NO	NA		0
Barto's Trailer Court	155	29,000	29,000	D,C	NO	NA		3120
Bittner's MHP	16	50,000	50,000 (2)	D,C	NO	NA		3100
Carpenters MHP	31	84,800	UNK	D,C	NO	NA		6300
Cogan Valley MHP	152	36,025	43,200 (2)	D,C,P,I,Fe	YES	36,015		5000
Collomsville Mutual Waterworks	179	40,000	NA	D,C	NO	NA		60,000
Fairlawn Trailer Court	7	32,000	NA	D,C	NO	NA		1000
Foxcroft Manor MHP	166	36,000	187,200 (6)	D,C,P,Fe	NO	NA		6400
Harvest Moon Trailer Court	30	295,200	UNK (2)	D,C,M,Fe	YES	57,600		27,000
Heatherbrooke Estates	5	72,000	115,200 (2)	D,C,M	NO	NA	1200	10,344
Hidden Valley MHC	160	unknown	201,600 (2)	D,M,Fe	NO	NA	204	7650
Hughesville Boro Water Auth.	178	1,440,000	UNK	D,C	NO	NA		647,000
Jersey Shore Area Joint Water Auth.	156	2,000,000	2,934,720 (6)	D,C,P,T	YES	3,000,000	1,500,000	2,777,000
Limestone Twp. Water Auth.	180	86,400	NA	D,C,P	YES	194,400	1,000	142,000
Loyalsock MHP	25	22,000	NA	D,C	NO	NA		360
Meadowbrook MHP	154	66,000	NA	D,C	NO	NA		12,000
Montgomery Boro W & S Auth.	161	1,059,000	UNK	D	NO	NA		500,000
Montoursville Boro Waterworks	175	1,140,000	UNK	D,C	NO	NA	660,000	1,050,000
Mountain Laurel MHP	20	44,000	NA	D,C,Fe	NO	NA		unknown
Muncy Boro Water Department	165	1,727,700	2.1 (3)	D	NO	NA	13,580	2,500,000*
Muncy State Correctional Inst.	176	504,000	490,000 (2)	D,C,P	YES	256,320	545,500	1,000,000
Oak-Lynn Manor MHP	153	35,000	69,000 (2)	D,C	NO	NA		3000
Orchard MHP	27	64,000	172,800 (4)	D,C	NO	NA		10,000
Pinecrest Village MHP	19	unknown	NA	D,C	NO	NA		12,000
Pleasant Pines MHP	168	14,000	UNK (1)	D,C,M,Fe	NO	NA		1100
Ralston Area Joint Auth.	171	74,880	NA	D	NO	NA	125,000	0
Roaring Branch Waterworks	182	15,840	NA	D,C	NO	NA		15,000
Tiadaghton View MHP	164	68,000	NA	D,C	NO	NA		2000
Timberend Estates MHP	34	78,000	NA	D,C,M,Fe	NO	NA		unknown
Twin Hills MHP	33	100,000	NA	D	NO	NA		480
Vali-View MHP	169	30,000	54,000 (2)	D,P	NO	NA		3700
Village Water Incorporated	174	497,000	72,000 (3)	D,P	NO	NA	32,000	23,000
Waterville Water Association	187	29,000	NA	D,C	NO	NA		31,000
Wilawan MHP	289	87,000	NA	D,C	NO	NA		1000
Williamsport Mun. Water Auth.	173	29,650,000	13.428 (16)	D,C,P,T,O	YES	12,500,000	1.081 bg	12,800,000
County Totals	**_**	**39.908mgd**	**18.876 mgd**	**-**	**6**	**16.044mgd**	**1.0838 bg**	**22.914 mgd**

(1) Last two digits of Public Water System identification number
(2) D = disinfection, C = corrosion control, M = manganese removal, P = particulates removal, T = taste/odor control, Fe = iron removal, I = inorganics removal, O = organics removal
* = 200,000 gallons of which is only available when reservoir is low
UNK = Unknown

Table 7
Community Water System Organization
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	PWS ID (1)	Ownership							Structure	
		Municipal	Authority	Water Association	Mobile Home Park	Investor	Federal	State	Inter-connection	Joint Cooperation (2)
ABC #2 MHP	10				X					
Allenwood Fed. Prison Camp	163						X			
American Tempo Village Park	2				X					
Barto's Trailer Court	155				X					
Bittner's MHP	16				X					
Carpenters MHP	31				X					
Cogan Valley MHP	152				X					
Collomsville Mutual Waterworks	179			X						
Fairlawn Trailer Court	7				X					
Foxcroft Manor MHP	166				X					
Harvest Moon Trailer Court	30				X					
Heatherbrooke Estates	5				X					
Hidden Valley MHC	160				X					
Hughesville Boro Water Auth.	178	X								
Jersey Shore Area Joint Water Auth.	156		X							
Limestone Twp. Water Auth.	180		X							
Loyalsock MHP	25				X					
Meadowbrook MHP	154				X					
Montgomery Boro W & S Auth.	161		X							
Montoursville Boro Waterworks	175	X								yes/19
Mountain Laurel MHP	20				X					
Muncy Boro Water Department	165	X								
Muncy State Correctional Inst.	176							X		
Oak-Lynn Manor MHP	153				X					
Orchard MHP	27				X					
Pinecrest Village MHP	19				X					yea/175
Pleasant Pines MHP	168				X					
Ralston Area Joint Auth.	171		X							
Roaring Branch Waterworks	182			X						
Tiadaghton View MHP	164				X					
Timberend Estates MHP	34				X					
Twin Hills MHP	33				X					
Vali-View MHP	169				X					
Village Water Incorporated	174					X				
Waterville Water Association	187			X						yes
Wilawan MHP	289				X					
Williamsport Mun. Water Auth.	173		X							
County Totals	-	**3**	**5**	**3**	**23**	**1**	**1**	**1**	**0**	**3**
Countywide Percent	-	**8%**	**14%**	**8%**	**62%**	**3%**	**3%**	**3%**	**0%**	**8%**

(1) Last two digits of Public Water System identification number
(2) Joint cooperation, management or purchase with another system

7. WATER RATES

A summary of water system rates is presented in Table 8. Seven of the County's CWSs, or 19%, have full metering, all of which charge based on water use levels. Twenty-five systems, or 68%, have limited metering (mostly one or two meters) and five systems have no metering (all mobile home parks). Twenty-five systems report that they include water charges in their monthly rent or other dues; therefore, no rate or charge information is available for these systems. Of the 12 systems that report that they charge specifically for water service, six have declining rate structures, with lower charges for each increment of water used, five systems use flat rate structures and one system has an inclining rate structure, with higher charges for each increment of water used. Inclining rate structures are thought to promote conservation of water through higher per unit charges as more water is consumed, while declining rate structures discourage water conservation because per unit charges decrease as more water is consumed.

Using rate schedules, a typical quarterly charge for residential use is estimated based on a usage level of 5,000 gallons per month, or 15,000 gallons per quarter. The resulting charges for reported systems range from $30 to $96.35, averaging $ 63.90 quarterly. A number of possible factors could account for the range in rates, including size of system, debt service. Rates that are too high may be a hardship for low and moderate income households. Rates that are too low may not cover production costs or permit adequate investment in the system for maintenance and water quality protection (see Financial Summary discussion). Further evaluation is provided in Chapter IV of this Plan.

8. FINANCIAL SUMMARY

A summary of financial data is presented in Table 9. This data is drawn primarily from survey responses as well as auditors' reports and financial statements. Financial data is available for 11 of the systems. The lack of financial data for other systems is largely because the water fees for many smaller systems, especially mobile home parks, are included in other dues or rent and separate financial records for water operations are not maintained. In addition, survey responses were not returned for two other systems. Five systems indicate the existence of a specific contingency fund, while six report equity in their systems and seven note that they carry debt. The data that is available indicates that two systems are operating at a loss, while seven systems are showing a profit and one is breaking even.

Table 8
Community Water System Rate Summary
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	Metering			Rate Structure			Billing Period		Rate Schedule			
	Full	Few	None	Declining	Flat	Inclining	Quarterly	Other	Quarterly Base Rate	Rate $/1000 gal	Block (gal) (1)	Quarterly Charge ($) (2)
ABC #2 MHP		X					NA	NA	NA	NA	NA	NA
Allenwood Fed. Prison Camp		X					NA	NA	NA	NA	NA	NA
American Tempo Village Park			X				NA	NA	NA	NA	NA	NA
Barto's Trailer Court		X					NA	NA	NA	NA	NA	NA
Bittner's MHP		X					NA	NA	NA	NA	NA	NA
Carpenters MHP		X					NA	NA	NA	NA	NA	NA
Cogan Valley MHP		X					NA	NA	NA	NA	NA	NA
Collomsville Mutual Waterworks		X			X			mo	75	NA	NA	75
Fairlawn Trailer Court		X					NA	NA	NA	NA	NA	NA
Foxcroft Manor MHP		X					NA	NA	NA	NA	NA	NA
Harvest Moon Trailer Court			X				NA	NA	NA	NA	NA	NA
Heatherbrook Estates MHP		X					NA	NA	NA	NA	NA	NA
Hidden Valley MHC		X					NA	NA	NA	NA	NA	NA
Hughesville Boro Water Auth.		X			X			yr.	16.17	NA	*	39
Jersey Shore Area Joint Water Auth.	X			X			X		43.62	2.84	>3000	77.77
Limestone Twp. Water Auth.	X					X	X		70	2.5	>5000	95
Loyalsock MHP		X					NA	NA	NA	NA	NA	NA
Meadowbrook MHP		X					NA	NA	NA	NA	NA	NA
Montgomery Boro W & S Auth.	X			X				mo.	13.5	22.95**	>1122	82.35
Montoursville Boro Waterworks	X				X		X		11.35	2.35	1000	46.6
Mountain Laurel MHP		X					NA	NA	NA	NA	NA	NA
Muncy Boro Water Department	X			X			X		22.5	4.3	>5000	65.5
Muncy State Correctional Inst.			X				NA	NA	NA	NA	NA	NA
Oak-Lynn Manor MHP		X					NA	NA	NA	NA	NA	NA
Orchard MHP		X					NA	NA	NA	NA	NA	NA
Pinecrest Village MHP		X					NA	NA	NA	NA	NA	NA
Pleasant Pines MHP		X					NA	NA	NA	NA	NA	NA
Ralston Area Joint Auth.		X		X				mo.	34.5	4.25	>1000	47.25
Roaring Branch Waterworks	X				X			mo	30	NA	NA	30
Tiadaghton View MHP		X					NA	NA	NA	NA	NA	NA
Timberend Estates MHP		X					NA	NA	NA	NA	NA	NA
Twin Hills MHP			X				NA	NA	NA	NA	NA	NA
Vali-View MHP			X				NA	NA	NA	NA	NA	NA
Village Water Incorporated		X			X		X		20	5.09	1000	96.35
Waterville Water Association		X		X				mo	60	2.5	>4000	67.5
Wilawan MHP		X					NA	NA	NA	NA	NA	NA
Williamsport Mun. Water Auth.	X			X			X		18	2.7	>5000	45
County Totals	**7**	**25**	**5**	**6**	**5**	**1**	**6**	**6**	-	-	-	**63.9**
Countywide Percent	**19%**	**68%**	**14%**	**16%**	**14%**	**3%**	**16%**	**16%**	-	-	-	-

(1) in addition to the base rate, most systems charge a rate per 1000 gallons of water used over the indicated block amount
(2) based on 5,000 gallons water use per household per month
NA = not applicable as water charges included in other dues/rent
* = Additional charges based on number of plumbing fixtures and appliances using water
** = Based on acre feet converted to gallons

Table 9
Financial Summary
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	Million Gallons (Annual)	Revenues ($)				Expenses ($)				Net Profit/ (Deficit) $	Contingency Fund $ (1)	Equity/ Fixed Assets	Long-Term Debt
		Operating	Other	Total	$/ 1000 gal	Operating	Other	Total	$/1000 gal				
ABC #2 MHP	1.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Allenwood Fed. Prison Camp	55.66	NA	NA	NA	NA	43,275	11,844	55,119	0.9	NA	NA	NA	NA
American Tempo Village Park	1.32	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barto's Trailer Court	1.96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bittner's MHP	1.68	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carpenters MHP	1.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cogan Valley MHP	3.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Collomsville Mutual Waterworks	10.59	25,000	0	25,000	2.36	18,000	0	18,000	1.42	7000	12,000	_	8000
Fairlawn Trailer Court	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Foxcroft Manor MHP	5.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Harvest Moon Trailer Court	8.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heatherbrooke Estates MHP	3.32	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hidden Valley MHC	1.46	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hughesville Boro Water Auth.	183.91	180,000	1000	181,000	0.98	180,000	0	180,000	0.98	1,000	50,000	_	435,673
Jersey Shore Area Joint Water Auth.	305.45	815,017	28,183	843,200	2.76	533,174	207,633	740,807		102,393	491,692	_	5,776,831
Limestone Twp. Water Auth.	47.24	85,241	3040	88,281	1.87	56,412	5,188	61,600	1.3	26,681	0	835,189	451,018
Loyalsock MHP	1.84	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Meadowbrook MHP	2.88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Montgomery Boro W & S Auth.	74.42	230,000	0	230,000	3.09	220,000	0	220,000	2.96	10,000	50,000	4,000,000	0
Montoursville Boro Waterworks	259.77	384,007	999	385,006	1.48	398,589	14,356	412,945	1.59	-27,939	_	_	_
Mountain Laurel MHP	1.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Muncy Boro Water Department	179.14	_	_	_	_	_	_	_	_	_	_	_	_
Muncy State Correctional Inst.	53.01	NA	NA	NA	NA	NA	NA	NA	NA	N	NA	NA	NA
Oak-Lynn Manor MHP	5.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Orchard MHP	10.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pinecrest Village MHP	2.82	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pleasant Pines MHP	0.96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ralston Area Joint Auth.	5.33	21,935	1300	23,235	4.36	23,325	0	23,325	4.38	(-90)	0	142,989	30,000
Roaring Branch Waterworks	3.12	_	_	_	_	_	_	_	_	_	_	_	0
Tiadaghton View MHP	2.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Timberend Estates MHP	8.71	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Twin Hills MHP	6.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vali-View MHP	3.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Village Water Incorporated	6.92	37,800	0	37,800	5.46	18,800	17,000	35,800	5.17	2000	0	501,000	664,000
Waterville Water Association	4.05	18,640	0	18,640	4.6	5255	13,385	18,640	4.6	0	30,705	172,000	75,397
Wilawan MHP	1.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Williamsport Mun. Water Auth.	2357.2	5,415,264	653,264	6,068,459	2.57	3,650,847	779,561	4,430,408	1.88	1,638,051	_	56,365,046	8,345,000

NA = Not applicable as water charges included in other dues/rent
_ = No response provided

C. NONCOMMUNITY WATER SYSTEMS

Noncommunity water systems are non-residential public water systems serving primarily commercial, industrial, institutional, and seasonal uses. Nontransient noncommunity (NN) water systems are those that regularly serve at least 25 of the same persons for at least six months every year, while transient noncommunity (TN) water systems provide service to at least 25 persons who are not the same for at least six months every year. There are 140 reported noncommunity water systems within Lycoming County, most of them commercial, and all of them using groundwater. These systems, for which virtually no data on water use are available, are identified in Table 10.

However, data was acquired through site visits with two nontransient noncommunity water systems that have the potential to assist in the provision of water to nearby community water systems and residences with on-lot water wells. The Crown American system currently serves the Lycoming Mall in Muncy Township and is supplied by two wells with a combined safe yield of 100,000 gpd. Current average daily water use is 111,323 gpd, while peak daily water use is 169,000 gpd. The system provides disinfection and has finished storage of 350,000 gallons. The PPL system in Fairfield Township has a safe yield of 504,000 gallons and raw storage of 125,000 gallons.

D. OTHER WATER WITHDRAWALS

Water is also withdrawn from the County's ground and surface water sources for industrial, mining, recreational and other non drinking water purposes by self-suppliers serving fewer than 25 persons. The DEP estimates that approximately 2.253 mgd is withdrawn by self-suppliers for various purposes (Division of Water Use Planning, 1999). Approximately 0.270 mgd of this is used for industry, while 1.835 mgd is used for mining, .128 mgd goes for recreational uses and .018 mgd is used for other purposes. Based on reporting of self-suppliers to DEP for 1999, 37% of the water withdrawn is from surface sources, while 63% is from groundwater sources. Historically, irrigation and other farm use of water within the County has been limited.

E. ON-LOT WATER WELLS

In 1990, 39% of all dwelling units in Lycoming County, or approximately 19,187 residences utilized on-lot water sources (U.S. Census, 1990). The vast majority of these units were served by on-lot wells, while a very small number utilized on-lot springs or surface water sources. This compares with 42% of the County's population which is currently estimated using AWSR data to be using on-lot wells, which is probably a high figure (see above discussion under Water Use). Using the 39% figure, average daily water use for the estimated 20,063 dwelling units served by on-lot water in 2000 can be calculated based on average household residential water use for community water systems of 177 gpd (68 gpd x 2.6 average household size). This yields a figure of about 3.551 mgd in water use.

Table 10
Noncommunity Water Systems
County Water Supply Plan
Lycoming County Planning Commission

Water System	Type	Water System	Type
Plunketts CR Township Volunteer Fire Company	TN	Eders Dairy Store	TN
Harvest Moon Bowling Lanes	TN	Loyalsock Tavern	TN
Port Drive-In % Mr. Joe Farrugg	TN	Fox's Restaurant	TN
Bings Motel	TN	Forest Inn	TN
Greentrees Motel	TN	Sheshequin Trail Campsites	TN
West Pharmaceuticals	NN	Pine Creek Valley Camping Court	TN
North 40 Campground	TN	Cerquozzi Diner	TN
Leighow's Amoco Food Shop #3	TN	Woodward Township Volunteer Fire Company	TN
Penn Hills Plaza	TN	Dragon Palace	TN
Robbin's Country Corner	TN	Hughesville Camp Meeting	TN
Cammal General Store	TN	E and E Camp	TN
Ye Olde Milkhouse Subs	TN	Pike Drive-In	TN
Muncy Homes, Inc., Office Well	NN	Whitetail Camper Court	TN
Muncy Homes, Inc., Superior Well	NN	Muncy American Legion – Clubhouse	TN
Muncy Homes, Inc., Premier Well	NN	Red Run Rod and Gun Club	TN
King's Motel Restaurant	TN	Mountain Tavern	TN
King's Motel Motel/Upper Well	TN	The Wagon Wheel	TN
Lycoming County Consolidated Sportsmen	TN	Black Forest Camping Area	TN
Muncy Homes Muncy Well	NN	Little Pine State Park	TN
Trout Pond park Skating Rink	TN	Lycoming Mall Crown America	NN
Haleeka Campground	TN	Happy Acres Campground	TN
George Ferrell Elementary	NN	Little Pine Tavern	TN
Cripple Bear Inn	TN	Mountain View Inn	TN
Immaculate Conception School	NN	C G Renn Elementary School	NN
Fry Brothers Turkey Ranch and Farm	TN	Country View Restaurant	TN
Loyalsock Valley Elementary	NN	Nisbit Station	TN
Harvest Moon Dairy Bar Restaurant	TN	Who's Inn	TN
Hull's Landing	TN	Morrone's Lounge % M. Morrone	TN
Sammy's Pizza	TN	Beaver Lake Lodge	TN
Fry Brothers Country Store	TN	Coastal Mart #27	TN
Ashler Manor	TN	Pennsylvania College of Technology	NN
Log Cabin Inn of Muncy	TN	Lyons Place at Powys	TN
Pettecoat Junction Campground	TN	220 Sandwich Shop	TN
Cedar Run Inn	TN	Hepburn Township Volunteer Fire Company	TN
Pat Reeders Tavern	TN	La Sa Quik	NN
Hotel Manor	TN	Lowes' Super Duper Markets	TN
Gibsons Hotel	TN	Turkey Hill #202	TN
The Sawmill	TN	Unity Market	TN
Inn 287	TN	Red Rooster Omelet House	TN
Best Beach Campground	TN	Donna's Place	TN
Venture Inn	TN	Knapp's English Center Store	TN
Pine Creek Inn	TN	Green's Family Market	TN
Susquehanna Campground	TN	Texas Blockhouse	TN
Nippenose Tavern	TN	Stovers General Store	TN
Henry's Bar-B-Q	TN	Four Seasons	TN
Trout Run Hotel	TN	Hall's General Store	TN
Camp Susque	TN	Yoder's Diner	TN
Steam Valley Inn	TN	W and K Food Services	TN
Deer Crossing Inn	TN	Muncy Township Volunteer Fire Company	TN
New Shore Acres	TN	Little Place Camping Area	TN
Eldred Township Volunteer Fire Company	TN	Papa's Pizza and Subs	TN
Clinton House Restaurant and Hotel	TN	Warrensville Store	TN
White Deer Golf Clubhouse	NN	Bit of Heaven Campground	TN
Tivoli Tavern	TN	Shultzs Country Market	TN
Crystal Lake Camp	TN	Weis Market #93	NN
Highland Lake	TN	Bittner's General Store	TN
Lycoming Valley Jr High School	NN	Black Walnut Bottom	TN
Hepburn Lycoming Elementary School	NN	McDonalds – Hughesville	TN
Woodward Township Elementary School	NN	Wolfe's General Store	TN
Happy Acres Snack Bar	TN	Proctor General Store	TN
Elimsport Elementary School	NN	Marsh Hill Market	TN
Nisbet Elementary School	NN	Christian Church at Cogan Station	TN
Antlers Country Club	TN	Susquehanna Division Serv. PP&L	NN
Trout Pond Park	TN	Chamberlain Nursery Ice Cream	TN
Lairdsville Inn	TN	Ski Sawmill Ski Lodge	TN
McCarty's Finish Line	TN	Ski Sawmill Farmhouse	TN
Angus Inn	TN	Oregon Hill Water and Sewer	TN
Creekside Manor Campground	TN	Johnny and Nancy's	TN
May's Drive-In	TN	Rattlesnake Rock Access	TN
Hemlock Valley Campground	TN	Construction Specialties	NN

NN – Nontransient Noncommunity
TN – Transient Noncommunity

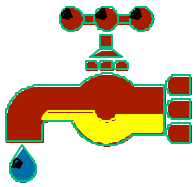
F. SUMMARY ANNUAL WATER USE

The table below estimates average daily water use within the County for community water systems, other withdrawals by self-suppliers, and individual on-lot water systems in 1999. About 63% of all water used was provided by community water systems, while 14% was withdrawn by self-suppliers and 22% was withdrawn by individual on-lot wells. Withdrawals for noncommunity water systems is unknown but greater than 0.111 mgd. Countywide water use for 1999 is estimated to be nearly 16 mgd.

1999 Estimated Annual Water Use
County Water Supply Plan
Lycoming County Planning Commission

Supplier	Average Daily MGD
Community Water Systems	9.932
Noncommunity Water Systems	0.111+
Withdrawals by Self-suppliers	2.253
On-lot Water Wells	3.551
Total	**15.847+**

III. COMMUNITY WATER SYSTEMS ANALYSIS



A. INTRODUCTION

This chapter projects future water needs, evaluates the capabilities of the County's community water systems to meet those needs, describes and reviews compliance with federal Safe Drinking Water Act requirements, and identifies specific system problem areas.

B. COMMUNITY WATER SYSTEMS

1. FUTURE WATER NEEDS

Projected future water needs are based on municipal population projections, projected growth areas, remedial water needs, and projected average and peak daily water use for each of the County's community water systems (CWSs). According to Annual Water Supply Reports (AWSRs) and County population estimates, during 1999, 74,632 persons, or approximately 56% of Lycoming County's population was served by community water systems. The County's boroughs are projected to provide public water to 87% of future households, while systems within townships will provide water to 24% of new households. In addition, the County's systems are anticipated to extend service to about 3% of existing households in need of remedial water service.

Tables 11A and B and Tables 12A and B summarize projected future community water needs for all of the County's municipalities, including water needs to be met by existing community water systems as well as potential new community water systems. Community water systems currently serve portions of 32 of 52 County municipalities and are projected by 2020 to serve 36 municipalities. In addition, the Roaring Branch system serves part of neighboring Tioga County, and the Jersey Shore system serves part of neighboring Clinton County, as noted in table footnotes. Table 11A identifies the existing "served" population and projects the 2000–2020 population increase anticipated for each municipality. For Lycoming County as a whole, the projected population increase is anticipated to be 38,677 persons, of whom approximately 10,992 or 28% will use community water. This proportion is lower than in the past because of anticipated decreases in the populations of several boroughs and the City, where public water has traditionally been provided; because 20 townships have no community water systems; because of zoning in several townships that permits sprawled growth; and because of public water systems which do not anticipate significant additional connections in the future. By the year 2020, approximately 50% of the County's total population is expected to be served by community water systems.

Table 11A
Projected 2020 Population To Be Served By Municipality
County Water Supply Plan
Lycoming County Planning Commission

Municipality	System	2000			Distribution of Additional Service (2000-2020)				2020		
		Pop.	# Served	% Served [1]	% Served[2]	Gain/Loss[3]	# Remedial[4]	# Total	Pop.	# Served	% Served [1]
CITY AND BOROUGHS											
Duboistown		1252	1214	97	50	55	19	74	1362	1288	95
	Williamsport		1214	97	50	55	19	74		1288	95
Hughesville		2080	2059	99	100	62	21	83	2142	2142	100
	Hughesville		2059	99	100	62	21	83		2142	100
Jersey Shore		4215	4215	100	100	-264	0	-264	3951	3951	100
	*Jersey Shore**		4215	100	100	-264	0	-264		3951	100
Montgomery		1552	1521	98	100	-146	31	-115	1406	1406	100
	Montgomery		1521	98	100	-146	31	-115		1406	100
Montoursville		4938	4938	100	100	-89	0	-89	4849	4849	100
	Montoursville		4938	100	100	-89	0	-89		4849	100
Muncy		2705	2705	100	100	87	0	87	2792	2792	100
	Muncy		2705	100	100	87	0	87		2792	100
Picture Rocks		686	0	0	100	55	686	741	741	741	100
	Picture Rocks New		0	0	100	55	686	741		741	100
Salladasburg		316	284	90	100	33	32	65	349	349	100
	Jersey Shore		284	90	100	33	32	65		349	100
S. Williamsport		6672	6472	97	50	184	100	284	7039	6756	96
	Williamsport		6472	97	50	184	100	284		6756	96
Williamsport		30,487	30,182	99	100	-2699	305	-2394	27,788	27,788	100
	Williamsport		30,182	99	100	-2699	305	-2394		27,788	100
Totals		**54,903**	**53,590**	**98**	**67**	**-2723**	**1194**	**-1529**	**52,419**	**52,062**	**99**
TOWNSHIPS											
Anthony		840	26	3	10	28	0	28	1122	54	5
	Jersey Shore		26	3	10	28	0	28		54	5
Armstrong		743	110	15	50	77	100	177	896	287	32
	Williamsport		36	5	50	77	100	177		213	24
	Mt. Laurel		74	10	0	0	0	0		74	8
Bastress		603	0	0	0	0	0	0	833	0	0
Brady		1499	725	48	17	175	0	175	2533	900	36
	Allenwood		725	48	17	175	0	175		900	36
Brown		99	0	0	0	0	0	0	96	0	0
Cascade		479	0	0	0	0	0	0	756	0	0
Clinton		3710	1616	44	95	1564	52	1616	5360	3232	60
	Montgomery		416	11	16	264	52	316		732	14
	Muncy St. Corr.		1200	32	79	1300	0	1300		2500	47
Cogan House		930	0	0	0	0	0	0	1234	0	0
Cummings		430	182	42	90	81	0	81	520	263	51
	Waterville		182	42	90	81	0	81		263	51
Eldred		2795	180	6	1	24	0	24	4368	204	5
	Pinecrest		180	6	1	24	0	24		204	5
Fairfield		4186	1260	30	75	2166	0	2166	7075	3426	48
	Timberend		360	9	0	0	0	0		360	5
	Twin Hills		372	9	0	0	0	0		372	5
	Vali-View		150	4	5	150	0	150		300	4
	Village Water		378	9	54	1572	0	1572		1950	28
	Lycoming Mall		0	0	15	444	0	444		444	6
Franklin		1000	0	0	5	10	100	110	1197	110	9
	Lairdsville New		0	0	5	10	100	110		110	9
Gamble		895	0	0	0	0	0	0	1296	0	0
Hepburn		3948	235	5	5	124	0	124	6419	359	5
	American		75	2	0	0	0	0		75	1
	Cogan Valley		160	4	5	124	0	124		284	4
Jackson		475	0	0	0	0	0	0	607	0	0
Jordan		959	0	0	0	0	0	0	1163	0	0
Lewis		1419	162	11	20	117	250	367	2003	529	26
	Bittner's		90	6	0	0	0	0		90	4
	Wilawan		72	5	16	92	0	92		164	8
	Trout Run New		0	0	4	25	250	275		275	14
Limestone		2270	960	42	50	497	0	497	3264	1457	45
	Collomsville		250	11	10	50	0	50		300	9
	Limestone		710	31	40	447	0	447		1157	35
Loyalsock		13,562	6703	49	12	1000	800	1800	22,017	8,503	39
	Williamsport		6703	49	12	1000	800	1800		8,503	39

Table 11A
Projected 2020 Population To Be Served By Municipality
County Water Supply Plan
Lycoming County Planning Commission

Municipality	System	2000			Distribution of Additional Service (2000-2020)				2020		
		Pop.	# Served	% Served [1]	% Served[2]	Gain/Loss[3]	# Remedial[4]	# Total	Pop.	# Served	% Served [1]
Lycoming		2356	138	6	0	0	195	195	3982	333	8
	ABC #2 MHP		75	3	0	0	0	0		75	2
	Fairlawn		63	3	0	0	0	0		63	1
	Williamsport		0	0	0	0	195	195		195	5
McHenry		272	0	0	0	0	0	0	334	0	0
McIntyre		598	450	75	90	18	0	18	618	468	76
	Ralston Area		450	75	90	18	0	18		468	76
McNett		197	10	5	90	6	0	6	191	16	8
	*Roaring Branch**		10	5	90	6	0	6		16	8
Mifflin		1399	260	19	30	248	0	248	2224	508	23
	Jersey Shore		260	19	30	248	0	248		508	23
Mill Creek		593	0	0	0	0	0	0	914	0	0
Moreland		1137	0	0	0	0	0	0	1517	0	0
Muncy		1168	0	0	50	159	117	276	1486	276	19
	Lycoming Mall		0	0	50	159	117	276		276	19
Muncy Creek		4354	1123	26	25	697	0	697	7140	1820	25
	Foxcroft		200	5	0	0	0	0		200	3
	Heatherbrooke		172	4	0	0	0	0		172	2
	Meadowbrook		216	5	0	0	0	0		216	3
	Muncy		486	11	24	671	0	671		1157	16
	Pleasant Pines		49	1	1	26	0	0		75	1
Nippenose		822	308	37	40	75	0	75	1009	383	38
	Jersey Shore		308	37	40	75	0	75		383	38
Old Lycoming		6853	3656	53	18	650	650	1300	10,542	4956	47
	Williamsport		3656	53	18	650	650	1300		4956	47
Penn		909	0	0	0	0	0	0	1210	0	0
Piatt		1350	146	11	20	138	0	138	2042	284	14
	Jersey Shore		146	11	20	138	0	138		284	14
Pine		288	0	0	0	0	0	0	284	0	0
Plunketts Creek		1121	0	0	0	0	0	0	1719	0	0
Porter		1557	909	58	50	130	0	130	1817	1039	57
	Jersey Shore		909	58	50	130	0	130		1039	57
Shrewsbury		441	0	0	0	0	0	0	530	0	0
Susquehanna		1233	0	0	0	0	0	0	1714	0	0
Upper Fairfield		2228	182	8	2	25	250	275	3514	457	13
	Loyalsock		91	4	0	0	0	0		91	3
	Tiadaghton		91	4	0	0	0	0		91	3
	Farragut New		0	0	2	25	250	275		275	8
Washington		1918	0	0	1	10	100	110	2931	110	4
	Elimsport New		0	0	1	10	100	110		110	4
Watson		723	0	0	0	0	0	0	875	0	0
Wolf		3706	934	25	50	1863	0	1863	6507	2797	43
	Barto's		63	2	0	7	0	7		70	1
	Hughesville		328	9	49	1834	0	1834		2162	33
	Oak-Lynn		250	7	0	0	0	0		250	4
	Orchard		293	8	1	22	0	22		315	5
Woodward		2771	540	19	2	25	0	25	4138	565	14
	Carpenters		125	5	2	25	0	25		150	4
	Harvest Moon		380	14	0	0	0	0		380	9
	Hidden Valley		35	1	0	0	0	0		35	1
Township Totals		**78,836**	**28,815**	**26%**	**24%**	**9907**	**2614**	**12,521**	**119,997**	**33,336**	**28%**
County Totals		**133,739**	**74,405**	**56%**	**28%**	**7185**	**3808**	**10,993**	**172,416**	**85,398**	**50%**

(1) = % of municipal population served
(2) = % of population growth served
(3) = projected new (or fewer) persons to be served
(4) = projected existing persons using on-lot wells to be served
* = Values in table for Lycoming County only. Jersey Shore is projected to serve six additional persons in Clinton County by 2020. Roaring Branch is projected to serve 134 additional persons in Tioga County by 2020.

Table 11B
Projected 2020 Population To Be Served By Community Water System
County Water Supply Plan
Lycoming County Planning Commission

System	Municipality	2000	Distribution of Additional Service			2020
		#Served	Gain/Loss[1]	# Remedial [2]	# Total	#Served
ABC #2	*Lycoming*	**75**	**0**	**0**	**0**	**75**
Allenwood	*Brady*	**725**	**175**	**0**	**175**	**900**
American	*Hepburn*	**75**	**0**	**0**	**0**	**75**
Barto's	*Wolf*	**63**	**7**	**0**	**7**	**70**
Bittner's	*Lewis*	**90**	**0**	**0**	**0**	**90**
Carpenters	*Woodward*	**125**	**25**	**0**	**25**	**150**
Cogan Valley	*Hepburn*	**160**	**124**	**0**	**124**	**284**
Collomsville	*Limestone*	**250**	**50**	**0**	**50**	**300**
Elimsport New System	*Washington*	**0**	**10**	**100**	**110**	**110**
Fairlawn	*Lycoming*	**63**	**0**	**0**	**0**	**63**
Farragut New System	*Upper Fairfield*	**0**	**25**	**250**	**275**	**275**
Foxcroft	*Muncy Cr.*	**200**	**0**	**0**	**0**	**200**
Harvest Moon	*Woodward*	**380**	**0**	**0**	**0**	**380**
Heatherbrooke	*Muncy Cr.*	**172**	**0**	**0**	**0**	**172**
Hidden Valley	*Woodward*	**35**	**0**	**0**	**0**	**35**
Hughesville		**2387**	**1896**	**21**	**1917**	**4304**
"	*Hughesville*	2059	62	21	83	2142
"	*Wolf*	328	1834	0	1834	2162
Jersey Shore*		**6148**	**388**	**32**	**420**	**6568**
"	*Jersey Shore*	4215	-264	0	-264	3951
"	*Porter*	909	130	0	130	1039
"	*Mifflin*	260	248	0	248	508
"	*Nippenose*	308	75	0	75	383
"	*Salladasburg*	284	33	32	65	349
"	*Piatt*	146	138	0	138	284
"	*Anthony*	26	28	0	28	54
Lairdsville New System	*Franklin*	**0**	**10**	**100**	**110**	**110**
Limestone	*Limestone*	**710**	**447**	**0**	**447**	**1157**
Loyalsock	*Upper Fairfield*	**91**	**0**	**0**	**0**	**91**
Lycoming Mall		**0**	**603**	**117**	**720**	**720**
"	*Fairfield*	0	444	0	444	444
"	*Muncy*	0	159	117	276	276
Meadowbrook	*Muncy Cr.*	**216**	**0**	**0**	**0**	**216**
Montgomery		**1937**	**118**	**83**	**201**	**2138**
"	*Montgomery*	1521	-146	31	-115	1406
"	*Clinton*	416	264	52	316	732
Montoursville	*Montoursville*	**4938**	**-89**	**0**	**-89**	**4849**
Mt. Laurel	*Armstrong*	**74**	**0**	**0**	**0**	**74**
Muncy Boro		**3191**	**758**	**0**	**758**	**3949**
"	*Muncy B.*	2705	87	0	87	2792
"	*Muncy Cr.*	486	671	0	671	1157
Muncy St. Corr.	*Clinton*	**1200**	**1300**	**0**	**1300**	**2500**
Oak-Lynn	*Wolf*	**250**	**0**	**0**	**0**	**250**
Orchard	*Wolf*	**293**	**22**	**0**	**22**	**315**
Picture Rocks New System	*Picture Rocks*	**0**	**55**	**686**	**741**	**741**
Pinecrest	*Eldred*	**180**	**24**	**0**	**24**	**204**
Pleasant Pines	*Muncy Cr.*	**49**	**26**	**0**	**26**	**75**
Ralston Area	*McIntyre*	**450**	**18**	**0**	**18**	**468**
Roaring Branch*	*McNett*	**10**	**6**	**0**	**6**	**16**
Tiadaghton	*Upper Fairfield*	**91**	**0**	**0**	**0**	**91**
Timberend	*Fairfield*	**360**	**0**	**0**	**0**	**360**
Trout Run New System	*Lewis*	**0**	**25**	**250**	**275**	**275**
Twin Hills	*Fairfield*	**372**	**0**	**0**	**0**	**372**
Vali-View	*Fairfield*	**150**	**150**	**0**	**150**	**300**
Village Water	*Fairfield*	**378**	**1572**	**0**	**1572**	**1950**
Waterville	*Cummings*	**182**	**81**	**0**	**81**	**263**
Wilawan	*Lewis*	**72**	**92**	**0**	**92**	**164**
Williamsport		**48,263**	**-733**	**2169**	**1436**	**49,699**
"	*Williamsport*	30,182	-2699	305	-2394	27,788
"	*Loyalsock*	6703	1000	800	1800	8503
"	*S. Williamsport*	6472	184	100	284	6756
"	*Old Lycoming*	3656	650	650	1300	4956
"	*DuBoistown*	1214	55	19	74	1288
"	*Lycoming*	0	0	195	195	195
"	*Armstrong*	36	77	100	177	213
County Totals		**74,405**	**7185**	**3808**	**10,993**	**85,398**

(1) = projected new (or fewer) persons to be served
(2) = projected existing persons using on-lot wells to be served
* = Values in table for Lycoming County only . Jersey Shore is projected to serve six additional persons in Clinton County by 2020. Roaring Branch is projected to serve 134 additional persons in Tioga County by 2020.

Population Projections by Municipality and Community Water System – Tables 11A and 11B identify projected 2020 population to be served within municipalities and by community water systems, respectively. Six of the County's 37 existing community water systems serve two or more municipalities. Eleven municipalities are served by two or more community water systems. Assumptions were made to estimate current population served as well as in projecting the distribution of new residents to be served by systems across municipal lines. These assumptions are as follows:

- For all boroughs and the City it was assumed that municipal systems will provide service to an estimated 100% of new population by the year 2020, except in Duboistown and South Williamsport, where steep slopes and higher elevations will probably only permit about half of new development to be served by public water. Thus, for the boroughs and the City, about 87% of new population is projected to be served, while the 2020 total served population should be about 99% of the 2020 population projection.

- 1999 (and 1998) Community water system Annual Water Supply Reports (AWSRs) provide data on population served for each system and on the number of residential and other connections within each municipality. While the populations served within each municipality by multi-municipal systems is not available, they have been estimated using AWSR data on percent of population served in each municipality (for city and boroughs), together with data on municipal and county average household sizes (for townships).

- For municipal systems and authorities, projections of new persons to be served were made based on a combination of factors, including: population projections, area zoning, survey responses and remedial water needs.

- For privately operated community water systems, including mobile home parks, it was assumed that the population served by each system would remain unchanged unless survey responses indicated that there were plans for system extensions to serve new connections.

- **Non-Residential Projections –** The 1999 AWSRs include information on non-residential connections, types of uses, and amount of water consumed by each type of use. Non-residential water use includes water for commercial, industrial, institutional, and other purposes. Using existing non-residential water use as baseline data, projections for increases in use were made by applying a percent increase over existing non-residential water use. These projections were made based primarily on the amount of buildable land with commercial or industrial zoning in close proximity to municipal systems or authorities.

Tables 11A and B identify two categories of new water needs as follows:

Gain/Loss – Tables 11A and B identify the number of projected new persons who could be served by existing or new community water systems through extensions. This Plan identifies 20 existing community water systems as well as five potential new systems that

could provide such service. For several borough systems and the City, negative values are shown, reflecting the projected loss of population for these communities by 2020.

Remedial - The Borough of Picture Rocks as well as concentrations of development within ten townships are recommended for remedial community water service. These are areas currently served by on-lot wells that are either currently experiencing water quality problems or can reasonably be expected to experience them in the future. While some of these areas are sufficiently close to an existing community water system to interconnect, others are not and would benefit from the provision of remedial water service by new community water systems. In addition, there are residences within most of the County's boroughs and the City that could and should be connected to existing community water systems.

Tables 12A and 12B use data from Tables 11A and 11B as well as Table 5 to project 2020 water needs by municipality and by community water system, respectively.

Projected Average/ Peak Daily Residential Water Needs – Projections are made for average and peak daily residential water needs, based on existing system average and peak daily residential water use. For new systems and systems with unknown average or peak values, estimates were made based on average County-wide figures and the County-wide ratio of average to peak daily water use of 1:1.67. Projected 2020 average daily residential water needs County-wide are an estimated 4.9 mgd, while peak needs are projected at an estimated 8.6 mgd.

Projected Non-residential Water Needs – Year 2020 County-wide need for water for commercial, industrial, institutional, and other uses to be served by community water systems is estimated to be 4.7 mgd. This does not include water needs for agriculture or for industrial, commercial or institutional uses provided by noncommunity systems or self-suppliers.

Projected Unaccounted-for Water – It must be assumed that there will continue to be unaccounted-for water among those community water systems that currently report this, which is most of the municipal systems and authorities. While unaccounted-for water includes primarily leakage, it may also include water used for fire fighting, water diverted through illegal taps or theft and misaccounting through meter or other error. It is assumed that unaccounted-for water in 2020 will be 20% of projected average residential and non-residential water demands for each system reporting unaccounted-for water in that year, or 1.7 mgd County-wide. This represents a reduction from the 1999 figure of 2.1 mgd and will require the commitment of those community water systems with high water loss rates to reduce those rates. Many systems already have active leak detection programs and some have recently brought their unaccounted-for water rates down. At the same time, the 20% figure allows latitude for the unexpected leak or break that might in the future occur in any system. Those systems that do not report unaccounted-for water undoubtedly also have water loss. Nonreporting systems include one that is fully metered, five that have no meters, and 29 that have one or two master meters. Most are mobile home parks.

Table 12A
Projected 2020 Water Needs By Municipality
County Water Supply Plan
Lycoming County Planning Commission

Municipalities	System	2020 Served	Residential Water Use				Non-Residential Water Use [1]				Unaccounted for Water Use [2]	2020 Total [3]	
			2000 Avg. Daily per Pers. (gpd)	2000 Peak Daily per Pers. (gpd)	2020 Avg. Daily Total (gpd)	2020 Peak Daily Total (gpd)	2000 Water Use (gpd)	% Increase in Water Use (gpd)	Additional Water Use (gpd)	2020 Total Water Use (gpd)		Total Avg. Daily (gpd)	Total Peak Daily (gpd)
CITY AND BOROUGHS													
Duboistown		**1,288**	**53**	**91**	**68,264**	**117,208**	**0**	**0**	**0**	**0**	**0**	**64,851**	**111,348**
	Williamsport	1,288	53	91	68,264	117,208	0	0	0	0	0	64,851	111,348
Hughesville		**2,142**	**165**	**252**	**353,430**	**539,784**	**82,643**	**50**	**41,322**	**123,965**	**166,825**	**620,350**	**797,387**
	Hughesville	2,142	165	252	353,430	539,784	82,643	50	41,322	123,965	166,825	620,350	797,387
Jersey Shore		**3,951**	**56**	**73**	**221,256**	**288,423**	**352,940**	**5**	**17,747**	**370,687**	**147,699**	**710,045**	**773,854**
	*Jersey Shore**	3,951	56	73	221,256	288,423	352,940	5	17,747	370,687	147,699	710,045	773,854
Montgomery		**1,406**	**57**	**101**	**80,142**	**142,006**	**67,288**	**50**	**33,644**	**100,932**	**41,185**	**213,205**	**271,976**
	Montgomery	1,406	57	101	80,142	142,006	67,288	50	33,644	100,932	41,185	213,205	271,976
Montoursville		**4,849**	**55**	**158**	**266,695**	**766,142**	**405,709**	**50**	**202,855**	**608,564**	**175,052**	**1,006,548**	**1,481,023**
	Montoursville	4,849	55	158	266,695	766,142	405,709	50	202,855	608,564	175,052	1,006,548	1,481,023
Muncy		**2,792**	**55**	**118**	**153,560**	**329,456**	**182,273**	**10**	**18,227**	**200,500**	**83,539**	**419,896**	**586,997**
	Muncy	2,792	55	118	153,560	329,456	182,273	10	18,227	200,500	83,539	419,896	586,997
Picture Rocks		**741**	**64**	**107**	**47,424**	**79,287**	**5,960**	**3**	**200**	**6,160**	**0**	**50,905**	**81,175**
	Picture Rocks New	741	64	107	47,424	79,287	5,960	3	200	6,160	0	50,905	81,175
Salladasburg		**349**	**56**	**73**	**19,544**	**25,477**	**0**	**0**	**0**	**0**	**0**	**18,567**	**24,203**
	Jersey Shore	349	56	73	19,544	25,477	0	10	0	0	0	18,567	24,203
S. Williamsport		**6,756**	**53**	**91**	**358,068**	**614,796**	**0**	**0**	**0**	**0**	**0**	**340,165**	**584,056**
	Williamsport	6,756	53	91	358,068	614,796	0	0	0	0	0	340,165	584,056
Williamsport		**27,788**	**53**	**91**	**1,472,764**	**2,528,708**	**2,273,853**	**10**	**227,385**	**2,501,238**	**1,027,057**	**4,802,359**	**5,805,506**
	Williamsport	27,788	53	91	1,472,764	2,528,708	2,273,853	10	227,385	2,501,238	1,027,057	4,802,359	5,805,506
Totals		***52,062***	_	_	*3,041,147*	*5,431,287*	*3,370,666*	_	*541,380*	*3,912,046*	*1,641,357*	*8,246,891*	*10,517,525*
TOWNSHIPS													
Anthony		**54**	**56**	**73**	**3,024**	**3,942**	**0**	**0**	**0**	**0**	**0**	**2,873**	**3,745**
	Jersey Shore	54	56	73	3,024	3,942	0	0	0	0	0	2,873	3,745
Armstrong		**287**	**_**	**_**	**16,321**	**27,745**	**0**	**0**	**0**	**0**	0	**15,505**	**26,358**
	Mountain Laurel	74	68	113e	5,032	8,362	0	0	0	0	0	4,780	7,944
	Williamsport	213	53	91	11,289	19,383	0	0	0	0	0	10,725	18,414
Bastress		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Brady		**900**	**NA**	**NA**	**NA**	**NA**	**152,504**	**25**	**36,811**	**189,315**	**0**	**179,850**	**323,000**
	Allenwood	900	NA	NA	NA	NA	152,504	25	36,811	189,315	0	179,850	323,000
Brown		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Cascade		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Clinton		**3,232**	**_**	**_**	**41,724**	**73,932**	**145,233**	**245**	**354,767**	**500,000**	**0**	**514,638**	**648,785**
	Muncy St. Corr.	2,500	NA	NA	NA	NA	145,233	245	354,767	500,000	0	475,000	578,550
	Montgomery	732	57	101	41,724	73,932	0	0	0	0	0	39,638	70,235
Cogan House		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Cummings		**263**	**55**	**96**	**14,465**	**25,248**	**1,065**	**10**	**107**	**1,172**	**0**	**14,855**	**25,099**
	Waterville	263	55	96	14,465	25,248	1,065	10	107	1,172	0	14,855	25,099

Table 12A
Projected 2020 Water Needs By Municipality
County Water Supply Plan
Lycoming County Planning Commission

Municipalities	System	2020 Served	Residential Water Use				Non-Residential Water Use [1]				Unaccounted for Water Use [2]	2020 Total [3]	
			2000 Avg. Daily per Pers. (gpd)	2000 Peak Daily per Pers. (gpd)	2020 Avg. Daily Total (gpd)	2020 Peak Daily Total (gpd)	2000 Water Use (gpd)	% Increase in Water Use (gpd)	Additional Water Use (gpd)	2020 Total Water Use (gpd)		Total Avg. Daily (gpd)	Total Peak Daily (gpd)
Eldred		**204**	**43**	**64**	**8,772**	**13,056**	**0**	**0**	**0**	**0**	**0**	**8,333**	**12,403**
	Pinecrest	204	43	64	8,772	13,056	0	0	0	0	0	8,333	12,403
Fairfield		**3,426**	_	_	**161,232**	**408,114**	**4,537**	**0**	**0**	**4,537**	**0**	**157,481**	**392,018**
	Village Water	1,950	38	135	74,100	263,250	4,537	0	0	4,537	0	74,705	254,398
	Lycoming Mall	444	64	107	28,416	47,508	0	0	0	0	0	26,995	45,133
	Twin Hills	372	48	108	17,856	40,176	0	0	0	0	0	16,963	38,167
	Timberend	360	66	103	23,760	37,080	0	0	0	0	0	22,572	35,226
	Vali-View	300	57	67	17,100	20,100	0	0	0	0	0	16,245	19,095
Franklin		**110**	**64**	**107**	**7,040**	**11,770**	**6,360**	**11**	**704**	**7,064**	**0**	**13,399**	**17,892**
	Lairdsville New	110	64	107	7,040	11,770	6,360	11	704	7,064	0	13,399	17,892
Gamble		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Hepburn		**359**	_	_	**20,072**	**35,804**	**0**	**0**	**0**	**0**	**0**	**19,068**	**34,014**
	American	75	48	76	3,600	5,700	0	0	0	0	0	3,420	5,415
	Cogan Valley	284	58	106	16,472	30,104	0	0	0	0	0	15,648	28,599
Jackson		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Jordan		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Lewis		**529**	_	_	**33,178**	**59,601**	**0**	**0**	**0**	**0**	**0**	**33,192**	**58,292**
	Bittner's	90	51	82	4,590	7,380	0	0	0	0	0	4,361	7,011
	Wilawan	164	67	139	10,988	22,796	0	0	0	0	0	10,439	21,656
	Trout Run New	275	64	107	17,600	29,425	0	10	1,760	1,760	0	18,392	29,626
Limestone		**1,457**	_	_	**101,906**	**156,543**	**12,600**	**5**	**63**	**12,663**	**15,953**	**124,794**	**176,699**
	Limestone	1,157	58	99	67,106	114,543	12,600	5	63	12,663	15,953	91,734	136,799
	Collomsville	300	116	140	34,800	42,000	0	0	0	0	0	33,060	39,900
Loyalsock		**8,503**	**53**	**91**	**450,659**	**773,773**	**0**	**0**	**0**	**0**	**0**	**428,126**	**735,084**
	Williamsport	8,503	53	91	450,659	773,773	0	0	0	0	0	428,126	735,084
Lycoming		**333**	_	_	**18,384**	**30,870**	**0**	**0**	**0**	**0**	**0**	**17,465**	**29,327**
	Williamsport	195	53	91	10,335	17,745	0	0	0	0	0	9,818	16,858
	ABC #2 MHP	75	67	112e	5,025	8,400	0	0	0	0	0	4,774	7,980
	Fairlawn	63	48	75	3,024	4,725	0	0	0	0	0	2,873	4,489
McHenry		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**	**0**
McIntyre		**468**	**31**	**52e**	**14,508**	**24,336**	**736**	**10**	**74**	**810**	**0**	**14,552**	**23,889**
	Ralston Area	468	31	52e	14,508	24,336	736	10	74	810	0	14,552	23,889
McNett		**16**	**93**	**123**	**1,488**	**1,968**	**0**	**0**	**0**	**0**	**0**	**1,414**	**1,870**
	*Roaring Branch**	16	93	123	1,488	1,968	0	0	0	0	0	1,414	1,870
Mifflin		**508**	**56**	**73**	**28,448**	**37,084**	**0**	**0**	**0**	**0**	**0**	**27,026**	**35,230**
	Jersey Shore	508	56	73	28,448	38,084	0	0	0	0	0	27,026	35,230
Mill Creek		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Moreland		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Muncy		**276**	**64**	**107**	**17,664**	**29,532**	**56,287**	**80**	**45,030**	**101,317**	**0**	**113,032**	**124,307**
	Lycoming Mall	276	64	107	17,664	29,532	56,287	80	45,030	101,317	0	113,032	124,307

Table 12A
Projected 2020 Water Needs By Municipality
County Water Supply Plan
Lycoming County Planning Commission

Municipalities	System	2020 Served	Residential Water Use				Non-Residential Water Use [1]				Unaccounted for Water Use [2]	2020 Total [3]	
			2000 Avg. Daily per Pers. (gpd)	2000 Peak Daily per Pers. (gpd)	2020 Avg. Daily Total (gpd)	2020 Peak Daily Total (gpd)	2000 Water Use (gpd)	% Increase in Water Use (gpd)	Additional Water Use (gpd)	2020 Total Water Use (gpd)		Total Avg. Daily (gpd)	Total Peak Daily (gpd)
Muncy Creek		**1,820**	_	_	**99,577**	**207,740**	**0**	**0**	**0**	**0**	**0**	**94,598**	**197,354**
	Muncy	1,157	55	118	63,635	136,526	0	0	0	0	0	60,453	129,700
	Meadowbrook	216	36	74	7,776	15,984	0	0	0	0	0	7,387	15,185
	Foxcroft	200	75	125e	15,000	25,000	0	0	0	0	0	14,250	23,750
	Heatherbrooke	172	53	140	9,116	24,080	0	0	0	0	0	8,660	22,876
	Pleasant Pines	75	54	82	4,050	6,150	0	0	0	0	0	3,848	5,843
Nippenose		**383**	**56**	**73**	**21,448**	**27,959**	**0**	**0**	**0**	**0**	**0**	**20,376**	**26,561**
	Jersey Shore	383	56	73	21,448	27,959	0	0	0	0	0	20,376	26,561
Old Lycoming		**4,956**	**53**	**91**	**262,668**	**450,996**	**0**	**0**	**0**	**0**	**0**	**249,535**	**428,446**
	Williamsport	4,956	53	91	262,668	450,996	0	0	0	0	0	249,535	428,446
Penn		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Piatt		**284**	**56**	**73**	**15,904**	**20,732**	**0**	**0**	**0**	**0**	**0**	**15,109**	**19,695**
	Jersey Shore	284	56	73	15,904	20,732	0	0	0	0	0	15,109	19,695
Pine		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Plunketts Creek		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Porter		**1,039**	**56**	**73**	**58,184**	**75,847**	**0**	**0**	**0**	**0**	**0**	**55,275**	**72,055**
	Jersey Shore	1,039	56	73	58,184	75,847	0	0	0	0	0	55,275	72,055
Shrewsbury		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Susquehanna		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Upper Fairfield		**457**	_	_	**28,611**	**46,988**	**0**	**10**	**1,760**	**1,760**	**0**	**28,853**	**46,310**
	Farragut New	275	64	107	17,600	29,425	0	10	1,760	1,760	0	18,392	29,626
	Tiadaghton	91	66	121	6,006	11,011	0	0	0	0	0	5,706	10,460
	Loyalsock	91	55	72	5,005	6,552	0	0	0	0	0	4,755	6,224
Washington		**110**	**64**	**107**	**7,040**	**11,770**	**2,540**	**3**	**704**	**3,244**	**0**	**9,770**	**14,263**
	Elimsport New	110	64	107	7,040	11,770	2,540	3	704	3,244	0	9,770	14,263
Watson		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Wolf		**2,797**	_	_	**407,290**	**600,494**	**0**	**0**	**0**	**0**	**0**	**386,926**	**570,471**
	Barto's	70	85	97	5,950	6,790	0	0	0	0	0	5,653	6,451
	Hughesville	2,162	165	252	356,730	544,824	0	0	0	0	0	338,894	517,583
	Oak-Lynn	250	60	67	15,000	16,750	0	0	0	0	0	14,250	15,913
	Orchard	315	94	102	29,610	32,130	0	0	0	0	0	28,130	30,524
Woodward		**565**	_	_	**31,730**	**46,970**	**0**	**0**	**0**	**0**	**0**	**30,144**	**44,622**
	Carpenters	150	38	79	5,700	11,850	0	0	0	0	0	5,415	11,258
	Harvest Moon	380	58	74	22,040	28,120	0	0	0	0	0	20,938	26,714
	Hidden Valley	35	114	200	3,990	7,000	0	0	0	0	0	3,791	6,650
Township Totals		**33,336**	_	_	**1,911,047**	**3,202,814**	**381,862**	_	**441,780**	**823,642**	**15,953**	**2,576,189**	**4,087,790**
County Totals		**85,398**	_	_	**4,912,484**	**3,634,101**	**3,752,528**	_	**983,160**	**4,735,688**	**1,657,310**	**10,823,080**	**14,605,315**

(1) = Commercial, nonresidential, institutional, industrial and other water use; water use for towns in multi-municipal systems included in that for borough/city.
(2) = Estimate based on 20% of 2020 average daily Residential and Non-residential water use for systems with current reported Unaccounted-for water
(3) = 2020 Residential and Non-residential water x .95 (5% conservation factor) plus Unaccounted-for water (Non-residential and Unaccounted-for water displayed under major municipal water recipient)
e = estimate for unknown peak water use based on County-wide average to peak ratio of 1:1.67
NA = Not applicable
* = Value in table for Lycoming County only (see Table 12B)

Table 12B
Projected 2020 Water Needs By Community Water System
County Water Supply Plan
Lycoming County Planning Commission

System	Municipality	2020 Served	Residential Water Use				Non-Residential Water Use (1)				2020 Unaccounted for Water (2)	2020 Total (3)	
			Avg. Daily per Pers. (gpd)	Peak Daily per Pers. (gpd)	2020 Avg. Daily Total (gpd)	2020 Peak Daily Total (gpd)	2000 Water Use (gpd)	2000-2020 % Increase	Additional Water Use (gpd)	2020 Total Water Use (gpd)		Total Avg. Daily (gpd)	Total Peak Daily (gpd)
ABC #2	*Lycoming*	**75**	**67**	**112e**	**5,025**	**8,400**	**0**	**0**	**0**	**0**	**0**	**4,774**	**7,980**
Allenwood	*Brady*	**900**	**NA**	**NA**	**NA**	**NA**	**152,504**	**25**	**36,811**	**189,315**	**0**	**179,850**	**323,000**
American	*Hepburn*	**75**	**48**	**76**	**3,600**	**5,700**	**0**	**0**	**0**	**0**	**0**	**3,420**	**5,415**
Barto's	*Wolf*	**70**	**85**	**97**	**5,950**	**6,790**	**0**	**0**	**0**	**0**	**0**	**5,653**	**6,451**
Bittner's	*Lewis*	**90**	**51**	**82**	**4,590**	**7,380**	**0**	**0**	**0**	**0**	**0**	**4,361**	**7,011**
Carpenters	*Woodward*	**150**	**38**	**79**	**5,700**	**11,850**	**0**	**0**	**0**	**0**	**0**	**5,415**	**11,258**
Cogan Valley	*Hepburn*	**284**	**58**	**106**	**16,472**	**30,104**	**0**	**0**	**0**	**0**	**0**	**15,648**	**28,599**
Collomsville	*Limestone*	**300**	**58**	**99**	**34,800**	**42,000**	**0**	**0**	**0**	**0**	**0**	**33,060**	**39,900**
Elimsport New	*Washington*	**110**	**64**	**107**	**7,040**	**11,770**	**2,540**	**3**	**704**	**3,244**	**0**	**9,770**	**14,263**
Fairlawn	*Lycoming*	**63**	**48**	**75**	**3,024**	**4,725**	**0**	**0**	**0**	**0**	**0**	**2,873**	**4,489**
Farragut New	*Upper Fairfield*	**275**	**64**	**107**	**17,600**	**29,425**	**0**	**10**	**1,760**	**1,760**	**0**	**18,392**	**29,626**
Foxcroft	*Muncy Cr.*	**200**	**75**	**125e**	**15,000**	**25,000**	**0**	**0**	**0**	**0**	**0**	**14,250**	**23,750**
Harvest Moon	*Woodward*	**380**	**58**	**74**	**22,040**	**28,120**	**0**	**0**	**0**	**0**	**0**	**20,938**	**26,714**
Heatherbrooke	*Muncy Cr.*	**172**	**53**	**140**	**9,116**	**24,080**	**0**	**0**	**0**	**0**	**0**	**8,660**	**22,876**
Hidden Valley	*Woodward*	**35**	**114**	**200**	**710,160**	**1,084,608**	**0**	**0**	**0**	**0**	**166,825**	**959,244**	**1,314,969**
Hughesville		**2,142**	**165**	**252**	**353,430**	**539,784**	**82,643**	**50**	**41,322**	**123,965**	**166,825**	**620,350**	**797,387**
"	*Hughesville*	2,162	"	"	356,730	544,824	82,643	50	41,322	123,965	168,442	338,894	517,583
	Wolf	2,191	"	"	361,515	552,132	0	0	0	0	0	343,439	524,525
Jersey Shore(4)		**6,568**	**56**	**73**	**367,808**	**479,464**	**352,940**	**5**	**17,747**	**370,687**	**147,699**	**849,269**	**957,196**
"	*Jersey Shore*	3,951	"	"	221,256	288,423	352,940	5	17,747	370,687	147,699	710,045	774,112
"	*Porter*	1,039	"	"	58,184	75,847	0	0	0	0	0	55,275	72,124
"	*Mifflin*	508	"	"	28,448	37,084	0	0	0	0	0	27,026	43,691
"	*Nippenose*	383	"	"	21,448	27,959	0	0	0	0	0	20,376	26,838
"	*Salladasburg*	349	"	"	19,544	25,477	0	0	0	0	0	18,567	24,203
"	*Piatt*	284	"	"	15,904	20,732	0	0	0	0	0	15,109	13,177
"	*Anthony*	54	"	"	3,024	3,942	0	0	0	0	0	2,873	3,051
Lairdsville New	*Franklin*	**110**	**64**	**107**	**7,040**	**11,770**	**6,360**	**11**	**704**	**7,064**	**0**	**13,399**	**17,892**
Limestone	*Limestone*	**1,157**	**58**	**99**	**67,106**	**114,543**	**12,600**	**5**	**63**	**12,663**	**15,953**	**91,734**	**136,799**
Loyalsock	*Upper Fairfield*	**91**	**55**	**72**	**5,005**	**6,552**	**0**	**0**	**0**	**0**	**0**	**4,755**	**6,224**
Lycoming Mall		**720**	**64**	**107e**	**46,080**	**77,040**	**56,287**	**80**	**45,030**	**101,317**	**0**	**140,027**	**169,440**
"	*Muncy*	276	"	"	17,664	29,532	56,287	80	45,030	101,317	0	113,032	124,307
"	*Fairfield*	444	"	"	28,416	47,508	0	0	0	0	0	26,995	45,133
Meadowbrook	*Muncy Cr.*	**216**	**36**	**74**	**7,776**	**15,984**	**0**	**0**	**0**	**0**	**0**	**7,387**	**15,185**
Montgomery		**2,138**	**57**	**101**	**121,866**	**215,938**	**67,288**	**50**	**33,644**	**100,932**	**41,185**	**252,843**	**318,800**
"	*Montgomery*	1,406	"	"	80,142	142,006	67,288	50	33,644	100,932	41,185	213,205	271,976
"	*Clinton*	732	"	"	41,724	73,932	0	0	0	0	0	39,638	46,824
Montoursville	*Montoursville*	**4,849**	**55**	**158**	**266,695**	**766,142**	**405,709**	**50**	**202,855**	**608,564**	**175,052**	**1,006,548**	**1,481,023**
Mt. Laurel	*Armstrong*	**74**	**68**	**113e**	**5,032**	**8,362**	0	0	0	0	0	**4,780**	**7,944**
Muncy Boro		**3,949**	**55**	**118**	**217,195**	**465,982**	**182,273**	**10**	**18,227**	**200,500**	**83,539**	**480,349**	**716,697**
"	*Muncy B.*	2,792	"	"	153,560	329,456	182,273	10	18,227	200,500	83,539	419,896	586,997
	Muncy Cr.	1,157	"	"	63,635	136,526	0	0	0	0	0	60,453	129,700

Table 12B
Projected 2020 Water Needs By Community Water System
County Water Supply Plan
Lycoming County Planning Commission

System	Municipality	2020 Served	Residential Water Use				Non-Residential Water Use (1)				2020 Unaccounted for Water (2)	2020 Total (3)	
			Avg. Daily per Pers. (gpd)	Peak Daily per Pers. (gpd)	2020 Avg. Daily Total (gpd)	2020 Peak Daily Total (gpd)	2000 Water Use (gpd)	2000-2020 % Increase	Additional Water Use (gpd)	2020 Total Water Use (gpd)		Total Avg. Daily (gpd)	Total Peak Daily (gpd)
Muncy St. Corr.	*Clinton*	**2,500**	**NA**	**NA**	**NA**	**NA**	**145,233**	**245**	**354,767**	**500,000**	**0**	**475,000**	**578,550**
Oak-Lynn	*Wolf*	**250**	**60**	**67**	**15,000**	**16,750**	**0**	**0**	**0**	**0**	**0**	**14,250**	**15,913**
Orchard	*Wolf*	**315**	**94**	**102**	**29,610**	**32,130**	**0**	**0**	**0**	**0**	**0**	**28,130**	**30,524**
Picture Rocks New	*Picture Rocks*	**741**	**64**	**107**	**47,424**	**79,287**	**5,960**	**3**	**200**	**6,160**	**0**	**50,905**	**81,175**
Pinecrest	*Eldred*	**204**	**43**	**64**	**8,772**	**13,056**	**0**	**0**	**0**	**0**	**0**	**8,333**	**12,403**
Pleasant Pines	*Muncy Cr.*	**75**	**54**	**82**	**4,050**	**6,150**	**0**	**0**	**0**	**0**	**0**	**3,848**	**5,843**
Ralston Area	*McIntyre*	**468**	**31**	**52**	**14,508**	**24,336**	**736**	**10**	**74**	**810**	**0**	**14,552**	**23,889**
Roaring Branch (5)	*McNett**	**16**	**93**	**123**	**1,488**	**1,968**	**0**	**0**	**0**	**0**	**0**	**1,414**	**1,870**
Tiadaghton	*U. Fairfield*	**91**	**66**	**121**	**6,006**	**11,011**	**0**	**0**	**0**	**0**	**0**	**5,706**	**10,460**
Timberend	*Fairfield*	**360**	**66**	**103**	**23,760**	**37,080**	**0**	**0**	**0**	**0**	**0**	**22,572**	**35,226**
Trout Run New	*Lewis*	**275**	**64**	**107**	**17,600**	**29,425**	**0**	**10**	**1,760**	**1,760**	**0**	**18,392**	**29,626**
Twin Hills	*Fairfield*	**372**	**48**	**108**	**17,856**	**40,176**	**0**	**0**	**0**	**0**	**0**	**16,963**	**38,167**
Vali-View	*Fairfield*	**300**	**57**	**67**	**17,100**	**20,100**	**0**	**0**	**0**	**0**	**0**	**16,245**	**19,095**
Village Water	*Fairfield*	**1,950**	**38**	**135**	**74,100**	**263,250**	**4,537**	**0**	**0**	**4,537**	**0**	**74,705**	**254,398**
Waterville	*Cummings*	**263**	**55**	**96**	**14,465**	**25,248**	**1,065**	**10**	**107**	**1,172**	**0**	**14,855**	**25,099**
Wilawan	*Lewis*	**164**	**67**	**139**	**10,988**	**22,796**	**0**	**0**	**0**	**0**	**0**	**10,439**	**21,656**
Williamsport		**49,699**	**53**	**91**	**2,634,047**	**4,522,609**	**2,273,853**	**10**	**227,385**	**2,501,238**	**1,027,057**	**5,905,578**	**7,699,712**
"	*Williamsport*	27,788	"	"	1,472,764	2,528,708	2,273,853	10	227,385	2,501,238	1,027,057	4,802,359	5,805,506
"	*Loyalsock*	8,503	"	"	450,659	773,773	0	0	0	0	0	428,126	735,084
"	*S. Williamsport*	6,756	"	"	358,068	614,796	0	0	0	0	0	340,165	584,056
"	*Old Lycoming*	4,956	"	"	262,668	450,996	0	0	0	0	0	249,535	428,446
	DuBoistown	1,288	"	"	68,264	117,208	0	0	0	0	0	64,851	111,348
	Lycoming	195	"	"	10,335	17,745	0	0	0	0	0	9,818	16,858
	Armstrong	213	"	"	11,289	19,383	0	0	0	0	0	10,725	18,414
County Totals		**85,398**	_	_	**4,912,484**	**8,634,101**	**3,752,528**	_	**983,160**	**4,735,688**	**1,657,310**	**10,823,080**	**14,605,315**

(1) = Commercial, nonresidential, institutional, industrial and other water uses; water use for towns in multi-municipal systems included in that for borough/city.
(2) = Estimate based on 20% of 2020 average daily Residential and Non-residential water use for systems with current reported Unaccounted-for water
(3) = 2020 Residential and Non-residential water x .95 (5% conservation factor) plus Unaccounted for water
(4) = Values in table for Lycoming County only; 2020 served for entire system is 6,574; 2020 total average daily projected water use is 849,588 gpd; peak is 955,759 gpd.
(5) = Values in table for Lycoming County only; 2020 served for entire system is 150; 2020 total average daily projected water use is 13,253 gpd; peak is 17,528 gpd.
e = Estimate for unknown peak water use based on County-wide average-to-peak ratio of 1:1.67
NA = Not applicable

Nonreporting systems should check regularly for leaks, ensure that master meters are properly calibrated, continually monitor water use for any unexpected increases, and eventually install customer meters. By reducing water loss, the need for additional costly sources, treatment and storage can sometimes be avoided, and user costs can be reduced. Under a contract with the Pennsylvania Rural Water Association, water loss audits can be completed at no cost to the water supplier.

Total Average/ Peak Daily Water Needs – Projected 2020 residential and non-residential water needs are added together and multiplied by a conservation factor of five percent, reflecting the growing number of public and private water conservation efforts. Where applicable, unaccounted-for water figures are added to these numbers to yield projected total water use figures. County-wide, average daily water use in 2020 is projected to be 10.8 mgd, while peak daily water use is projected to be 14.6 mgd. These represent only slight increases over the 1999 figures of 9.9 mgd average daily water use (9% increase) and 13.3 mgd peak daily water use (10% increase). These minimal increases are due to the projected loss of population currently served in the County's boroughs and City and the limited number of new persons projected to be served in townships, together with a significant projected reduction in unaccounted-for water and projected conservation efforts.

2. ADEQUACY OF WATER SOURCE

The adequacy of water sources is evaluated in Table 13. In this table, "safe yield" is used to determine the ability of each system to meet peak daily water needs in 1999 and for the year 2020. Water shortfalls or surpluses are noted for 1999 and 2020. Peak daily water needs may also be met through provision of adequate storage, as discussed in section 4, which follows. In addition, each system is evaluated with respect to its ability to supply adequate water in the event that its single best source should go out of service. For this reason, the availability of more than one water supply source with the ability to meet 2020 average daily needs is evaluated. Also, operators for each system were asked whether they had experienced water shortage in times of drought, and whether there is a DEP-approved Emergency Response Plan, an on-site or portable emergency power generator available, and a contractual arrangement for an alternate water source in an emergency, available for use. Emergency Response Plans address much more than adequacy of source. Such plans should be reviewed regularly for consistency with DEP's Public Water Supply Manual – Part VI Emergency Response. Finally, Table 13 notes systems that could potentially be interconnected with other systems (located within approximately one mile of each other), providing for emergency if not supplemental water needs.

Of the 37 community water systems serving Lycoming County, 33, or 89% of the total, reported adequate safe yields to meet current peak water needs. Nine of these have more than 100,000 gpd in residual water availability, seven of them in municipal systems or authorities. One system – Pinecrest Village MHP - has an unknown safe yield; therefore, the adequacy of its water sources cannot be determined. Historic source pumping data, which might provide an approximation of available water, is not available for this system.

Table 13
Adequacy of Community Water Source
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	PWS ID (1)	Safe Yield						Drought Shortfall	Emergency Response Measures			Potential Interconnect (4)
		2000			2020							
		Safe Yield	Adequate	Shortfalls/ Surplus (gpd) (2)	Adequate	Shortfalls / Surplus (gpd) (2)	Adequate w/Best Source Out of Service (3)		Plan	Emer. Power Gen.	Alternate Water Provision	
ABC #2 MHP	10	36,000	YES	27,600e	YES	28,020e	NO	_	_	_	_	YES
Allenwood Fed. Prison Camp	163	223,900	NO	-51,400	NO	-99,100	NO	NO	NO	YES	NO	NO
American Tempo Village Park	2	8700	YES	3010	YES	3285	NO	_	_	_	_	NO
Barto's Trailer Court	155	20,000	YES	13,878	YES	13,549	NO	NO	NO	YES	NO	YES
Bittner's MHP	16	50,000	YES	42,600	YES	42,989	NO	_	_	_	_	NO
Carpenters MHP	31	63,000	YES	53,160	YES	51,742	YES	NO	YES	NO	NO	NO
Cogan Valley MHP	152	102,000	YES	85,000	YES	73,401	YES	NO	NO	NO	NO	NO
Collomsville Mutual Waterworks	179	30,000	NO	-5000	NO	-9900	NO	YES	NO	NO	NO	YES
Fairlawn Trailer Court	7	32,000	YES	27,300	YES	27,511	NO	_	_	_	_	YES
Foxcroft Manor MHP	166	36,000	YES	49,124e	YES	12,250e	YES	_	_	_	_	NO
Harvest Moon Trailer Court	30	32,000	YES	4000	YES	5286	YES	_	_	_	_	NO
Heatherbrooke Estates MHP	5	72,000	YES	48,000	YES	49,124	UNK	_	_	_	_	YES
Hidden Valley MHC	160	6000	NO	-1000	NO	-650	NO	_	_	_	_	NO
Hughesville Boro Water Auth.	178	1,440,000	YES	728,000	YES	125,031	NO	NO	YES	YES	NO	YES
Jersey Shore Area Joint Water Auth.	156	2,410,000	YES	1,471,000	YES	1,454,241	YES	NO	YES	YES	NO	NO
Limestone Twp. Water Auth.	180	100,000	YES	-59,000	NO	-36,796	NO	_	_	YES	_	YES
Loyalsock MHP	25	10,000	YES	3440	YES	3776	NO	NO	YES	NO	NO	YES
Meadowbrook MHP	154	43,200	YES	27,200	YES	28,015	YES	NO	YES	NO	_	YES
Montgomery Boro W & S Auth.	161	953,000	YES	527,110	YES	610,789	YES	NO	YES	YES*	NO	YES
Montoursville Boro Waterworks	175	1,500,000	YES	277,000	YES	18,977	YES	NO	YES	YES	NO	NO
Mountain Laurel MHP	20	44,000	YES	36,056e	YES	36,056e	YES	NO	YES	NO	NO	YES
Muncy Boro Water Department	165	1,286,000	YES	591,986	YES	569,303	YES	NO	_	NO	NO	YES
Muncy State Correctional Inst.	176	643,600	YES	466,600	YES	65,050	NO	NO	NO	YES	NO	YES
Oak-Lynn Manor MHP	153	35,000	YES	18,300	YES	19,087	NO	_	_	_	_	YES
Orchard MHP	27	251,000	YES	221,000	YES	220,476	YES	NO	YES	YES	NO	YES
Pinecrest Village MHP	19	UNK	UNK	UNK	UNK	UNK	UNK	YES	YES	NO	YES	NO
Pleasant Pines MHP	168	7000	YES	3000	YES	1157	NO	NO	YES	NO	NO	YES
Ralston Area Joint Auth.	171	73,000	YES	49,600e	YES	49,111e	YES	NO	YES	NO	NO	NO
Roaring Branch Waterworks	182	15,840	YES	4540	NO	-1,688	NO	NO	YES	NO	NO	NO
Tiadaghton View MHP	164	68,000	YES	57,000	YES	57,540	YES	_	_	_	_	YES
Timberend Estates MHP	34	47,000	YES	10,000	YES	11,774	NO	_	_	_	_	YES
Twin Hills MHP	33	50,000	YES	10,000	YES	11,833	YES	_	_	_	_	YES
Vali-View MHP	169	30,000	YES	20,000	YES	10,905	NO	_	_	_	_	YES
Village Water Incorporated	174	252,000	YES	196,300	NO	-2,398	YES	NO	YES	_	NO	YES
Waterville Water Association	187	24,480	YES	5980	YES	111	NO	NO	NO	NO	NO	NO
Wilawan MHP	289	73,000	YES	62,962	YES	51,344	NO	NO	YES	NO	NO	NO
Williamsport Mun. Water Auth.	173	12,200,000	YES	3,919,000	YES	4,470,688	YES	NO	YES	YES	NO	YES
County Totals	_		33	_	30	_	16	2	16	10	1	22
Countywide Percent	_	_	89%	_	81%	_	43%	5%	43%	27%	3%	59%

(1) Public Water System identification number (last two digits)
(2) Adequacy of safe yield to meet peak water needs
(3) Adequacy of safe yield to meet average water needs
(4) For systems within approximately one mile of another system
_ = No survey response
* = underway
UNK = Unknown
e = estimated (unknown existing peak water use)

However, as the survey response indicates a recent shortage in time of drought, it may be assumed that the system has inadequate safe yield to meet current and future demand and should be evaluated. The Collomsville system, which also responded in the survey that it has experienced water shortfalls in recent times of drought, was also one of the systems with inadequate safe yields to meet current and future demand. Projected year 2020 peak water needs are anticipated to be able to be met by 32 systems.

Of the 37 water systems, 15 or 41% of the total, utilize single wells as their water source. Should any of these sources go out of service for any reason, these systems will produce no water. In addition, another six water systems with more than one water source have safe yields that would be inadequate to meet average 2020 water needs with their best source out of service. This leaves 16 systems, or 43%, with anticipated adequate 2020 safe yields should any of their best sources be out of service.

Under the provisions of the Pennsylvania Safe Drinking Water Act Regulations §109-707, each community water system is required to develop an Emergency Response Plan (ERP) to establish procedures for a variety of emergencies. Sixteen systems, or 43%, indicated that they have a DEP-approved ERP. The purpose of the ERP is to establish contingency measures to be followed in the event of potential contamination and possible structural, equipment, natural and other failures that could endanger the water supply. According to DEP, many ERPs are not current and many are inadequate. The DEP offers a course on developing ERPs, which community water systems may avail themselves of. The minimum requirements of an emergency response plan are summarized in Appendix C. Only 10 systems, or 27%, responded that they have an emergency power generator on-site or available. No systems have a contractual arrangement for an alternate water source in the event of an emergency.

Finally, 22 community water systems, or 59%, have the potential for an interconnection as they lie within approximately one mile of one or more other systems.

3. ADEQUACY OF WATER TREATMENT

All of Lycoming County's community water systems are subject to the requirements of the federal Safe Drinking Water Act (SDWA) of 1974 and amendments and the Pennsylvania Safe Drinking Water Act and Regulations, which set forth monitoring requirements, programs and rules to protect drinking water quality (see Appendix D). The DEP divides community water systems into three categories based on population served. Small systems serve 3,300 or fewer persons, medium systems serve between 3,301 and 10,000 persons, and large systems serve more than 10,000 persons. All but three of the community water systems in Lycoming County are small, while the Jersey Shore and Montoursville systems are considered medium, and the Williamsport system is considered large. Monitoring regulations for some contaminants differ somewhat for water systems based on the size of the system.

Table 14 provides data on adequacy of water treatment. All of the County's 37 community water systems provide disinfection, as they are minimally required to do. In addition, 32 others provide further treatment, including corrosion control, taste/odor control, and the removal of manganese, organics, inorganics, particulates, and iron. Six systems – Cogan Valley, Harvest Moon, Jersey Shore, Limestone, Muncy State and Willliamsport - provide filtration; three of these systems use surface water sources and one uses springs and at least one other may be influenced by surface water.

Water quality compliance is difficult to evaluate, as systems that are usually in compliance may occasionally be found in noncompliance. Normally, noted problems are rectified immediately. Of the County's 37 community water systems, three have been found, during one or more monitoring periods in the last three years (1997-00) to be in noncompliance with current water quality standards. The table notes the areas in which maximum contaminant levels or action levels have been exceeded or violated, which include coliform, copper and nitrates. Exceedances indicate individual monitoring test results (often taken quarterly) that are above action levels or maximum contaminant levels. Violations reflect either single sample high contaminant levels or monitoring results over the course of a year, which average above action levels or maximum contaminant levels. Therefore, one or more exceedences for a contaminant may or may not result in a violation at year's end. In addition, two systems indicate that they have lead lines, raising the potential for elevated lead levels of delivered water for these systems.

Table 14 further evaluates the potential for surface water influence on groundwater sources. Community water systems that utilize wells or springs that are surface water influenced must provide for filtration of the water supply or locate alternative water sources. The DEP has evaluated several of the County's systems for surface water influence. Those systems influenced by surface water usually exhibit one or both of the following indicators:

1. The well is less than 50 feet deep or of unknown depth.
2. The well water becomes cloudy or turbid, and undergoes changes in temperature after a storm event.

Until recently, an additional indicator was wells within 200 feet of a surface water source. Of the nine systems that have been evaluated for surface water influence, the Ralston Area system has been determined to be influenced by surface water, the Montgomery Borough has been found to possibly be influenced by surface water, the evaluation for Foxcroft Manor is ongoing, and six others systems have been determined to be not influenced. Two other systems that may be subject to surface water influence have not yet been, but will be required to be, evaluated. The remainder of the County's systems should be evaluated for surface water influence.

Table 14
Adequacy of Community Water Treatment
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	Existing Treatment				Surface Water Influence	
	Treatment (1)	Filtration	Lead Lines	AL/MCL Exceedances (2)	Evaluated	Influenced
ABC #2 MHP	D	NO	_	_	NO	UNK
Allenwood Fed. Prison Camp	D	NO	NO	coliform	NO	UNK
American Tempo Village Park	D,T	NO	_	_	NO	UNK
Barto's Trailer Court	D,C	NO	NO	NO	NO	UNK
Bittner's MHP	D,C	NO	_	_	NO	UNK
Carpenters MHP	D,C	NO	NO	NO	NO	UNK
Cogan Valley MHP	D,C,P,I,Fe	YES	NO	NO	NO	UNK
Collomsville Mutual Waterworks	D,C	NO	NO	NO	NO	UNK
Fairlawn Trailer Court	D,C	NO	_	_	NO	UNK
Foxcroft Manor MHP	D,C,P,Fe	NO	_	_	ONGOING	UNK
Harvest Moon Trailer Court	D,C,M,Fe	YES	_	_	NO	UNK
Heatherbrooke Estates MHP	D,C,M	NO	_	_	NO	UNK
Hidden Valley MHC	D,M,Fe	NO	_	_	NO	UNK
Hughesville Boro Water Auth.	D,C	NO	NO	copper	YES	NO
Jersey Shore Area Joint Water Auth.	D,C,P,T	YES	NO	NO	YES	NO
Limestone Twp. Water Auth.	D,C,P	YES	_	_	NO	UNK
Loyalsock MHP	D,C	NO	NO	NO	NO	UNK
Meadowbrook MHP	D,C	NO	NO	NO	NO	UNK
Montgomery Boro W & S Auth.	D	NO	NO	nitrates	ONGOING	MAYBE
Montoursville Boro Waterworks	D,C	NO	NO	NO	YES	NO
Mountain Laurel MHP	D,C,Fe	NO	NO	NO	NO	UNK
Muncy Boro Water Department	D	NO	NO	NO	NO	UNK
Muncy State Correctional Inst.	D,C,P	YES	YES	NO	YES	YES
Oak-Lynn Manor MHP	D,C	NO	_	_	NO	UNK
Orchard MHP	D,C	NO	NO	NO	NO	UNK
Pinecrest Village MHP	D,C	NO	NO	NO	YES	NO
Pleasant Pines MHP	D,C,M,Fe	NO	NO	NO	NO	UNK
Ralston Area Joint Auth.	D	NO	NO	NO	YES	YES
Roaring Branch Waterworks	D,C	NO	NO	NO	NO	UNK
Tiadaghton View MHP	D,C	NO	_	_	NO	UNK
Timberend Estates MHP	D,C,M,Fe	NO	_	_	NO	UNK
Twin Hills MHP	D	NO	_	_	NO	UNK
Vali-View MHP	D,P	NO	_	_	NO	UNK
Village Water Incorporated	D,P	NO	NO	NO	YES	NO
Waterville Water Association	D,C	NO	NO	NO	NO	UNK
Wilawan MHP	D,C	NO	NO	NO	NO	UNK
Williamsport Mun. Water Auth.	D,C,P,T,O	YES	YES	NO	YES	NO
County Totals	_	**6**	**2**	**3**	**10**	**2**
Countywide Percent	_	**16%**	**5%**	**8%**	**27%**	**5%**

(1) D = disinfection, C = corrosion control, M = manganese removal, P = particulates removal, T = taste/odor control, Fe = iron removal, I = inorganics removal, O = organics removal
(2) Action levels or maximum contaminant levels exceeded in last three years (1997-2000)
_ = No survey response
UNK = Unknown

4. ADEQUACY OF FINISHED WATER STORAGE

Adequacy of finished water storage is evaluated in Table 15. Storage adequacy is evaluated both with respect to the need for water for human consumption and for firefighting purposes. The PA DEP recommends that finished water storage for domestic demands be between one day's average and one day's peak water use, depending upon safe yield. The DEP also recommends that community water systems evaluate their own water needs for firefighting purposes using the requirements of the Insurance Services Office (ISO). However, in the absence of data about the existence of any such evaluations, this Plan makes its own recommendations for water storage for firefighting purposes. Recommended storage for systems providing fire protection is computed after consideration of distribution storage.

ISO firefighting standards for systems with fire hydrants are identified in the table below.

ISO Recommended Firefighting Reserve Capacities

Use	Capacity
Residential	60,000 gallons (500 gpm for two hours)
Commercial, Institutional	120,000 gallons (1000 gpm for two hours)
Industrial	180,000 gallons (1500 gpm for two hours)

An evaluation of the adequacy of finished water storage that considers safe yield is presented in Chapter IV. Table 15 evaluates minimal storage adequacy based on existing storage alone. Nineteen of the County's 37 community water systems, or 51%, currently have adequate distribution storage capacity for one day's average water use, while 18 other systems do not. Two systems lack any storage at all, while another three systems have storage of fewer than 1,000 gallons. Storage for two systems is unknown. All system storage shortfalls are for mobile home parks. Useable storage volume available was computed for those systems with hydropneumatic tanks. All such systems with reported PADWIS values were found either to meet the recommended 20-minute retention time or to be primarily reliant on other finished storage, with the exception of the Twin Hill system, which requires supplemental storage. Nine of the County's systems possess more than 100,000 gallons in storage capacity, all of them municipal systems, authorities or institutional uses. By the year 2020, 17 or 46% of the County's community water systems will provide adequate water storage for consumption.

Of the 12 systems that have fire hydrants used for fire fighting, all municipal systems, authorities or institutional uses, eight have adequate firefighting storage capacity and four do not. Of the 25 systems without fire hydrants used for fire fighting, eight have adequate storage capacity, 15 do not and for two it is unknown whether adequate storage capacity exists. By the year 2020, seven or 19% (58% of applicable) systems are projected to continue to have sufficient water storage for firefighting purposes.

Table 15
Adequacy of Community Finished Water Storage
County Water Supply Plan
Lycoming County Planning Commission

Community Water Systems	Distribution Storage Capacity (1)					Fire Flow Storage Capacity (2)			
	2000			2020		2000		2020	
	Finished Storage	Adequate	Shortfall/ Surplus (gal)	Adequate	Shortfall/ Surplus (gal)	Adequate	Shortfall/ Surplus (gal)	Adequate	Shortfall/ Surplus (gal)
ABC #2 MHP	3400	NO	-1,600	NO	-1,374	NA	NA	NA	NA
Allenwood Fed. Prison Camp	1,250,000	YES	1,097,496	YES	1,070,150	YES	977,496	YES	950,150
American Tempo Village Park	0	NO	-3624	NO	-3420	NA	NA	NA	NA
Barto's Trailer Court	3120	NO	-2250	NO	-2533	NA	NA	NA	NA
Bittner's MHP	3100	NO	-1503	NO	-1261	NA	NA	NA	NA
Carpenters MHP	6,300	YES	1,494	YES	885	NA	NA	NA	NA
Cogan Valley MHP	5000	NO	-4241	NO	-10,648	NA	NA	NA	NA
Collomsville Mutual Waterworks	60,000	YES	31,000	YES	26,940	NO	-29,000	NO	-33,060
Fairlawn Trailer Court	1000	NO	-2000	NO	-1873	NA	NA	NA	NA
Foxcroft Manor MHP	6400	NO	-8600	NO	-7850	NA	NA	NA	NA
Harvest Moon Trailer Court	27,000	YES	5000	YES	6062	NA	NA	NA	NA
Heatherbrooke Estates MHP	10,344	YES	1240	YES	1684	NA	NA	NA	NA
Hidden Valley MHC	7650	YES	3650	YES	3859	NA	NA	NA	NA
Hughesville Boro Water Auth.	647,000	YES	143,132	NO	-312,244	NO	-36,868	NO	-497,747
Jersey Shore Area Joint Water Auth.	2,777,000	YES	1,940,153	YES	1,927,412	YES	1,760,153	YES	1,747,412
Limestone Twp. Water Auth.	142,000	YES	12,566	YES	50,269	NO	-107,434	NO	-69,731
Loyalsock MHP	360	NO	-4681	NO	-4395	NA	NA	NA	NA
Meadowbrook MHP	12,000	YES	4122	YES	4613	NA	NA	NA	NA
Montgomery Boro W & S Auth.	500,000	YES	296,099	YES	247,157	YES	116,099	YES	67,157
Montoursville Boro Waterworks	1,050,000	YES	338,304	YES	43,452	YES	158,304	NO	-136,548
Mountain Laurel MHP	UNK	UNK	UNK	UNK	UNK	NA	NA	NA	NA
Muncy Boro Water Department	2,500,000	YES	2,009,206	YES	2,019,651	YES	1,829,206	YES	1,839,651
Muncy State Correctional Inst.	1,000,000	YES	854,767	YES	525,000	YES	734,767	YES	405,000
Oak-Lynn Manor MHP	3000	NO	-12,000	NO	-11,250	NA	NA	NA	NA
Orchard MHP	10,000	NO	-17,500	NO	-18,130	NA	NA	NA	NA
Pinecrest Village MHP	12,000	YES	4262	YES	3667	NA	NA	NA	NA
Pleasant Pines MHP	1100	NO	-1525	NO	-2748	NA	NA	NA	NA
Ralston Area Joint Auth.*	0	NO	-14,597	NO	-14,553	YES	50,403	YES	50,447
Roaring Branch Waterworks	15,000	YES	6464	YES	1,747	NA	NA	NA	NA
Tiadaghton View MHP	2000	NO	-4000	NO	-3706	NA	NA	NA	NA
Timberend Estates MHP	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK
Twin Hills MHP	480	NO	-17,260	NO	-16,483	NA	NA	NA	NA
Vali-View MHP	3700	NO	-4800	NO	-12,545	NA	NA	NA	NA
Village Water Incorporated	23,000	YES	4052	NO	-51,705	NA	NA	NA	NA
Waterville Water Association	31,000	YES	19,893	YES	16,145	NO	-100,107	NO	-103,855
Wilawan MHP	1000	NO	-3804	NO	-9,439	NA	NA	NA	NA
Williamsport Mun. Water Auth.	12,800,000	YES	6,341,915	YES	6,875,832	YES	6,161,915	YES	6,485,677
County Totals	**22,913,954**	**19**	_	**17**	_	**8**	_	**7**	_
Countywide Percent	_	**51%**	_	**46%**	_	**22%**	_	**19%**	_

(1) Equal to average daily water use
(2) NA = Not applicable to systems without hydrants; for systems with hydrants, capacity computed after consideration of distribution storage, as follows: 60,000 gallons for systems with residential uses only, 120,000 gallons for systems with institutional and commercial uses and 180,000 gallons for systems with industrial uses
* = System has 125,000 gallons in raw storage that could be converted to finished storage

In summary, about half of the County's community water systems, primarily small systems, are currently and are expected in the future to be deficient in water storage capacity both for distribution and fire fighting purposes.

5. ADEQUACY OF PUMPING AND DISTRIBUTION SYSTEMS

Table 16 evaluates the adequacy of source and transmission pumping and distribution systems. Thirty systems, or 81%, have adequate source pumping capabilities to meet projected year 2020 peak day needs. Of the 13 systems with known pumping stations, 87% have adequate capability to meet year 2020 needs.

The evaluation of system distribution lines was done largely for purposes of assessing fire protection and interconnection capabilities and is based on survey responses, DEP PADWIS database and input from the regional DEP office. Twelve community water systems indicate that they have hydrants used for fire protection. Number of hydrants is noted in parentheses where this information was supplied. The remaining systems presumably rely on public tanker trucks or local surface sources, such as farm ponds and dry hydrants along streams.

Only those water systems utilizing fire hydrants or with the potential to be interconnected to other systems were evaluated for adequate piping diameter, which is six inches. For fire hydrant systems, three of the twelve applicable systems meet this standard, while five have some piping that meets the standard, three systems have inadequate piping diameter and the diameters of the remainder are unknown. For the 22 systems with the potential for interconnections (within one mile of another system), three meet this standard while two have some piping that meets this standard, and the remainder have inadequate or unknown piping diameter.

Survey results and regional DEP input indicate that adequate pressure (minimum 20 psi under all conditions, including fire) is provided in 27 systems while three indicate inadequate pressure and pressure is unknown for the remaining systems. Sixteen systems or 43 % reportedly have blow-off valves, while 21 do not. At least 13 systems lack both blow-off valves and hydrants; all but one of them are mobile home parks. Blow-off valves or hydrants are important to enable the periodic flushing of the system. Finally, sixteen systems, or 43%, indicate on annual water supply reports that they have cross-connection control programs to minimize the potential for contaminated water entering the system; it is unknown whether these programs are DEP approved.

Table 16
Adequacy of Community Pumping and Distribution Systems
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	2000 Pumping		2020 Pumping		Distribution					
	Source (gpd)	Trans. (gpd)/ # pumps	Adequate Source (gpd) (1)	Adequate Trans. (gpd) (1)	Fire Protection				Blow-Off Valves	CCC Program (5)
					Hydrants (2)	Pressure (3)	Adequate Piping (4)			
							Fire	Interconnects		
ABC #2 MHP	UNK	UNK(1)	UNK	UNK	NO	YES	NA	NO	YES	NO
Allenwood Fed. Prison Camp	369,000	369,000(2)	YES	YES	YES(11)	YES	YES	NA	NO	NO
American Tempo Village Park	32,000	NA	YES	NA	NO	YES	NA	NA	NO	NO
Barto's Trailer Court	29,000	29,000(1)	YES	YES	NO	YES	NA	NO	NO	NO
Bittner's MHP	50,000	50,000(2)	YES	YES	NO	YES	NA	NA	YES	NO
Carpenters MHP	84,800	NA	YES	NA	NO	YES	NA	NA	NO	YES
Cogan Valley MHP	36,025	43,200(2)	YES	YES	NO	YES	NA	NA	YES	YES
Collomsville Mutual Waterworks	40,000	NA	YES	NA	YES(6)	YES	PARTIAL	PARTIAL	YES	NO
Fairlawn Trailer Court	32,000	NA	YES	NA	NO	YES	NA	NO	NO	NO
Foxcroft Manor MHP	36,000	187,200(6)	YES	YES	NO	YES	NA	NA	NO	NO
Harvest Moon Trailer Court	295,200	UNK(2)	YES	UNK	NO	YES	NA	NA	UNK	YES
Heatherbrooke Estates MHP	72,000	115,200(2)	YES	YES	NO	YES	NA	UNK	NO	NO
Hidden Valley MHC	UNK	201,600(2)	UNK	YES	NO	YES	NA	NA	NO	NO
Hughesville Boro Water Auth.	1.44 mgd	UNK	YES	UNK	YES(66)	YES	YES	YES	YES	YES (u)
Jersey Shore Area Joint Water Auth.	2 mgd	1.495(4)	YES	YES	YES(157)	YES	PARTIAL	NA	YES	YES
Limestone Twp. Water Auth.	86,400	NA	NO	NA	YES(_)	YES	PARTIAL	PARTIAL	YES	NO
Loyalsock MHP	22,000	NA	YES	NA	NO	YES	NA	NO	NO	NO
Meadowbrook MHP	66,000	NA	YES	NA	NO	YES	NA	NO	YES	YES
Montgomery Boro W & S Auth.	1.06 mgd	UNK	YES	UNK	YES(83)	NO	NO	YES	YES	NO
Montoursville Boro Waterworks	1.14 mgd	UNK	NO	UNK	YES(_)	YES	UNK	NA	YES	YES
Mountain Laurel MHP	44,000	NA	YES	NA	NO	NO	NA	NO	YES	NO
Muncy Boro Water Department	1.73 mgd	2.1(3)	YES	YES	YES(_)	UNK	UNK	UNK	YES	YES
Muncy State Correctional Inst.	504,000	490,000(2)	NO	NO	YES(_)	YES	UNK	UNK	YES	YES
Oak-Lynn Manor MHP	35,000	69,000(2)	YES	YES	NO	YES	NA	UNK	NO	NO
Orchard MHP	64,000	172,800(4)	YES	YES	NO*	YES	NA	NO	YES	YES
Pinecrest Village MHP	UNK	NA	UNK	NA	NO	YES	NA	NA	NO	YES
Pleasant Pines MHP	14,000	UNK(1)	YES	UNK	NO	UNK	NA	UNK	NO	NO
Ralston Area Joint Auth.	74,880	NA	YES	NA	YES(4)	YES	PARTIAL	NA	YES	YES
Roaring Branch Waterworks	15,840	NA	NO	NA	NO	YES	NA	NA	NO	NO
Tiadaghton View MHP	68,000	NA	YES	NA	UNK	UNK	NO	NO	NO	YES
Timberend Estates MHP	78,000	NA	YES	NA	UNK	UNK	UNK	UNK	YES	NO
Twin Hills MHP	100,000	NA	YES	NA	UNK	UNK	NO	NO	NO	YES
Vali-View MHP	30,000	54,000(2)	YES	YES	UNK	UNK	UNK	UNK	NO	NO
Village Water Incorporated	497,000	72,000(3)	YES	NO	YES(9)**	NO	NA	YES	NO	NO
Waterville Water Association	29,000	NA	YES	NA	YES(1)	YES	NO	NA	YES	NO
Wilawan MHP	87,000	NA	YES	NA	NO	YES	NA	NA	NO	YES
Williamsport Mun. Water Auth.	29.65 mgd	13.428+(16)	YES	YES	YES(939)	UNK	UNK	UNK	YES	YES
County Totals	38.911 mgd	18.876 mgd	30	13	13	27	3+5P	3+2P	16	16
Countywide Percent	_	_	81%	87% of applicable	35%	73%	67% of applic.	24% of applic.	43%	43%

(1) Ability to supply peak daily 2020 water demand
(2) Number of fire hydrants is in parentheses
(3) Minimum 20 psi under all conditions
(4) minimum 6-inch diameter piping; applies only to fire hydrant systems (fire) and systems within one mile of another system (interconnects)
(5) Cross-Connection Control Program
partial = some piping meets standard while some does not
UNK = Unknown = Underway
* = Public fire hydrants and lake = Not used for firefighting
NA = Not applicable
_ = No survey response = No survey response

6. AGE OF SYSTEM STRUCTURAL COMPONENTS

Table 17 identifies the decades of construction of the structural components of the County's community water systems. No evaluation was made of the age of these components because age alone is not always a good indicator of their condition nor are the data necessarily reflective of more recent system upgrades. Water quality and water treatment greatly influence component and, particularly, pipe condition, with corrosive water thinning out pipes and contributing to leakage and hard water depositing materials and choking water flow. However, in general, new structural components are more effective and resistant to corrosion.

7. ADEQUACY OF OPERATIONAL MANAGEMENT

The adequacy of system management is assessed in Table 18 based on size of the system, operations, social indicators and financial factors. As noted in the preceding section, Lycoming County has one large system and two medium systems, while the rest are small systems. Larger systems often experience economies of scale that promote cost-effective operation and professional management.

Operational adequacy criteria include: a system with two certified operators, an approved Operation and Maintenance (O & M) Plan which is being implemented and a current Annual Water Supply Report. All 37 of the County's community water systems have been officially permitted by the DEP. Nineteen systems, or 51%, have certified primary operators with the necessary qualifications to operate their particular systems. DEP regulations require that all community water systems have both a primary and a secondary certified operator (Public Water Supply Manual, Part V, 7.3). However, just seven of the County's systems, or 16%, have secondary certified operators with the necessary qualifications to operate their systems. The remaining 30 systems either lack a secondary operator altogether or have secondary operators who lack certification at the level required for their system. An additional problem is systems with absentee operators who allow someone who is not certified to perform day-to-day operations. The primary areas of deficiency are a lack of primary and secondary operators and operators who are not certified to operate their particular type of system. The addition of chemicals to water supplies is an issue of serious concern, and all of the County's community water systems are strongly encouraged to maintain two fully qualified certified operators at all times.

Fourteen systems, or 38%, have indicated on the system surveys that they have approved O&M Plans. According to the regional DEP office, many O & M Plans are inadequate. O&M Plans need to be reviewed regularly to determine if they are complete and up-to-date. Recordkeeping is evaluated, including submission of a 1999 Annual Water Supply Report (AWSR) to DEP. Twenty-four systems, or 65%, have submitted their 1999 AWSRs to the DEP; these reports are required to be submitted annually. Not evaluated in this plan are the monthly system operation reports meeting DEP requirements. These reports can be useful in determining average monthly water use and in estimating safe yields of systems.

Table 17
Age of System Structural Components
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	Age of System Component					
	Source/Pumps	Filter Plant	Trans. Pumps	Trans. Piping	Distrib. Piping	Finished Storage
ABC #2 MHP	80s	NA	70s	80s	70s	90s
Allenwood Fed. Prison Camp	80s	NA	50s	40s, 80s	40s	40s
American Tempo Village Park	90s	NA	90s	70s, 90s	70s	70s
Barto's Trailer Court	UNK	NA	80s	80s	70s	80s
Bittner's MHP	90s	NA	80s	70s, 90s	70s	80s
Carpenters MHP	90s	NA	UNK	UNK	UNK	80s
Cogan Valley MHP	UNK	70s	80s	UNK	UNK	80s
Collomsville Mutual Waterworks	30s	NA	UNK	60s	30s, 60s, 70s	90s
Fairlawn Trailer Court	UNK	NA	UNK	UNK	UNK	UNK
Foxcroft Manor MHP	80s	NA	90s	UNK	UNK	90s
Harvest Moon Trailer Court	90s	90s	90s	UNK	UNK	90s
Heatherbrooke Estates MHP	90s	NA	90s	80s	80s	90s
Hidden Valley MHC	90s	NA	90s	70s, 90s	60s	90s
Hughesville Boro Water Auth.	80s, 00s	NA	NA	NA	50s	90s
Jersey Shore Area Joint Water Auth.	pre-30, 90s	60s	60s, 90s	pre-30	pre-30-00s	pre-30, 60s, 80s
Limestone Twp. Water Auth.	pre-30, 40s, 90s	90s	90s	40s, 80s	40s, 60s, 70s	90s
Loyalsock MHP	90s	NA	UNK	70s, 90s	70s	70s
Meadowbrook MHP	UNK	NA	NA	NA	70s	UNK
Montgomery Boro W & S Auth.	90s	NA	UNK	70s, 90s	pre-30	UNK
Montoursville Boro Waterworks	50s, 90s	NA	NA	NA	pre-30-00s	40s, 80s
Mountain Laurel MHP	UNK	NA	NA	NA	70s	70s
Muncy Boro Water Department	90s	NA	UNK	UNK	UNK	70s, 80s
Muncy State Correctional Inst.	pre-30, 60s, 90s	90s	90s	pre-30, 90s	90s	90s
Oak-Lynn Manor MHP	90s	NA	90s	UNK	UNK	90s
Orchard MHP	70s	NA	90s	70s, 90s	70s	90s
Pinecrest Village MHP	UNK	NA	NA	NA	UNK	UNK
Pleasant Pines MHP	90s	NA	90s	UNK	UNK	UNK
Ralston Area Joint Auth.	80s	NA	UNK	90s	UNK	pre-30, 60s
Roaring Branch Waterworks	60s	NA	UNK	60s	60s	60s
Tiadaghton View MHP	80s	NA	UNK	80s	80s	80s
Timberend Estates MHP	80s	NA	NA	NA	UNK	UNK
Twin Hills MHP	60s	NA	UNK	60s	60s	60s
Vali-View MHP	90s	NA	90s	UNK	UNK	90s
Village Water Incorporated	90s	NA	80s	50s, 70s, 90s	50s	UNK
Waterville Water Association	90s	NA	UNK	90s	90s	90s
Wilawan MHP	80s	NA	UNK	70s, 90s	80s	UNK
Williamsport Mun. Water Auth.	pre-30-90s	90s	pre-30, 40s-90s	pre-30-90s	pre-30-90s	pre-30, 50s-90s

UNK = Unknown

Table 18
Adequacy of Community Operational Management
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	System Size	Operations				Financial				Social Indicators (8)
		Certified Operator (1)		Approved O&M Plan (2)	Current AWSR (3)	Reasonable Rates (4)	Costs Adeq. Covered (5)	Reas. Oper. Revenues (6)	Reas. Oper. Expenses (7)	
		Primary	Secondary							
ABC #2 MHP	Small	YES	NONE	_	NO	NA	NA	NA	NA	NA
Allenwood Fed. Prison Camp	Small	NONE	NONE	YES	YES	NA	NA	NA	YES	NA
American Tempo Village Park	Small	YES	NONE	_	YES	NA	NA	NA	NA	NA
Barto's Trailer Court	Small	NONE	NONE	YES	YES	NA	NA	NA	NA	NA
Bittner's MHP	Small	NONE	NONE	_	NO	NA	NA	NA	NA	P
Carpenters MHP	Small	NO	NONE	YES	YES	NA	NA	NA	NA	I
Cogan Valley MHP	Small	YES	YES	NO	YES	NA	NA	NA	NA	NA
Collomsville Mutual Waterworks	Small	NO	NONE	NO	NO	YES	YES	YES	YES	NA
Fairlawn Trailer Court	Small	NO	NONE	_	NO	NA	NA	NA	NA	P, I
Foxcroft Manor MHP	Small	NO	NONE	_	NO	NA	NA	NA	NA	NA
Harvest Moon Trailer Court	Small	NONE	NONE	_	NO	NA	NA	NA	NA	I
Heatherbrooke Estates MHP	Small	NO	NONE	_	NO	NA	NA	NA	NA	NA
Hidden Valley MHC	Small	NO	NONE	_	NO	NA	NA	NA	NA	I
Hughesville Boro Water Auth.	Small	YES	NO	YES	YES	YES	YES	YES	YES	I
Jersey Shore Area Joint Water Auth.	Medium	YES	YES	YES	YES	YES	YES	YES	YES	P, I
Limestone Twp. Water Auth.	Small	YES	NONE	_	NO	YES	YES	NO	YES	NA
Loyalsock MHP	Small	NO	NONE	YES	YES	NA	NA	NA	NA	NA
Meadowbrook MHP	Small	NO	NONE	YES	YES	NA	NA	NA	NA	NA
Montgomery Boro W & S Auth.	Small	YES	YES	NO	YES	YES	YES	YES	YES	P, I
Montoursville Boro Waterworks	Medium	YES	YES	YES	YES	YES	NO	YES	YES	NA
Mountain Laurel MHP	Small	YES	NONE	YES	NO	NA	NA	NA	NA	NA
Muncy Boro Water Department	Small	YES	YES	NO	YES	YES	_	_	_	I
Muncy State Correctional Inst.	Small	YES	YES	NO	YES	NA	NA	NA	NA	NA
Oak-Lynn Manor MHP	Small	NO	NONE	_	NO	NA	NA	NA	NA	NA
Orchard MHP	Small	NO	NONE	YES	YES	NA	NA	NA	NA	NA
Pinecrest Village MHP	Small	YES	NONE	YES	YES	NA	NA	NA	NA	NA
Pleasant Pines MHP	Small	NO	NONE	NO	NO	NA	NA	NA	NA	NA
Ralston Area Joint Auth.	Small	YES	NONE	NO	YES	YES	NO	YES	NO	P, I
Roaring Branch Waterworks	Small	YES	NO	NO	YES	YES	_	_	_	P, I
Tiadaghton View MHP	Small	YES	NONE	_	YES	NA	NA	NA	NA	NA
Timberend Estates MHP	Small	NONE	NONE	_	YES	NA	NA	NA	NA	NA
Twin Hills MHP	Small	YES	NONE	_	YES	NA	NA	NA	NA	NA
Vali-View MHP	Small	NO	NONE	_	NO	NA	NA	NA	NA	NA
Village Water Incorporated	Small	YES	NONE	YES	YES	YES	YES	NO	NO	NA
Waterville Water Association	Small	YES	NONE	NO	YES	YES	NO	YES	NO	I
Wilawan MHP	Small	NONE	NONE	YES	YES	NA	NA	NA	NA	P
Williamsport Mun. Water Auth.	Large	YES	YES	YES	YES	YES	YES	YES	YES	P, I
County Totals	**37**	**19**	**7**	**14**	**24**	**12**	**7**	**8**	**8**	**8P, 12I**
Countywide Percent	**100%**	**51%**	**19%**	**38%**	**65%**	**32%**	**19%**	**22%**	**22%**	**35%**

(1) NO = operator needs higher level of training; NONE = no certified operator; UNK = qualifications of operator unknown
(2) Operation and Maintenance Plan
(3) Annual Water Supply Report
(4) Annual water rates do not exceed 1.5% of median household income of municipality
(5) See Table 9 Net Profit/Deficit column
(6) Per connection
(7) Per 1000 gallons
(8) P = Below the poverty line; I = Low household income
_ = No response to survey

Social indicators provide background information by which to evaluate the relative affordability of water service to households. Water service is considered to be less affordable to households in municipalities in which 1) the percent of families living below the poverty line is greater than 9.5% and 2) the median household income is less than 90% of that for the State. Eight of the County's community water systems are located in municipalities that fall below the poverty threshold, while 12 are located in municipalities that fall below the income threshold.

Finally, financial management is evaluated. The systems are evaluated for reasonable quarterly rates. Rates are considered to be reasonable if annual water charges do not exceed 1.5% of median household income for the municipality in which the system is located (Pennvest criteria). All 12 applicable systems have annual water charges that are below this standard and therefore considered to be affordable. As a qualifier, it must be stated that this determination of reasonability of rates is more a reflection of the affordability of water service to the consumer than it is an indicator of the current and future viability of community water systems from a financial standpoint. An assessment of the reasonability of rates from the system perspective, that is of the ability of rates to fully cover existing and future system costs, including indebtedness and the need for future improvements, should be undertaken by each system. Seven systems have costs that are exceeded by revenues, while three systems have costs that are not. Twenty-five systems do not separate water expenses and revenues from other expenses and revenues, and so cannot be evaluated in this manner. Two systems did not return the survey or did not submit financial data and therefore cannot be evaluated.

Systems were also evaluated for reasonable operating expense per 1000 gallons (less than $3.80), reasonable operating revenues per connection (less than $350) and the existence of an annual operating water budget, capital water budget and water accounting system.

C. NON-COMMUNITY WATER SYSTEMS AND OTHER WITHDRAWALS

A number of non-community water systems serving commercial, institutional and industrial uses on the perimeter of some of the County's municipal systems could benefit from connection to the municipal systems while allowing the municipal systems to grow in a logical fashion and expand their rate bases. Some of these systems may be experiencing water quality problems and water quality is generally not as closely monitored as for community water systems. The number of new non-community water systems within the County is projected to continue to grow but should be discouraged in areas where community water systems can provide the needed service. The location of large noncommunity system within close proximity to existing CWSs could adversely impact CWS water yields. Withdrawal of water by self-suppliers may also be expected to increase. The location of large, new self-suppliers should similarly be discouraged near existing CWSs.

As noted in Chapter II, two noncommunity systems – the Lycoming Mall and PPL system - have the potential to assist other nearby systems and water users. Strengths of the Lycoming Mall system include its possession of an emergency generator unit and fire and booster pumps as well as its willingness to assist. Strengths of the PPL system include significant excess safe yield and raw storage capacity.

D. ON-LOT WATER SUPPLIES

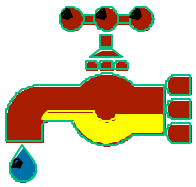
Problems encountered by individual well and spring users include substandard quality and sometimes low yields. Fecal coliform contamination and high nitrate concentrations from on-lot sewage disposal systems and farming practices are other problems encountered by on-lot water system users in the County. The land application of fertilizers, manure, septage, sludge, and pesticides can result in reduced surface and groundwater quality. Unfenced livestock, overapplication of nutrients, and lack of buffer strips separating pasture and croplands from streams contribute to the problem.

On-lot sewage disposal problems stem from a combination of factors, including inadequately sized sewage disposal fields, too-close on-lot sewage disposal systems, failure to maintain and periodically empty septic tanks, and improperly sited and constructed wells. On-lot sewage disposal systems throughout the State were not regulated by the DEP until 1966. Failing on-lot sewage disposal systems, as a result of improper siting or poor soils and old systems in need of replacement, can contribute to surface and groundwater quality problems.

Where groundwater problems, and specifically fecal coliform contamination, already exists, they can sometimes be remedied by the installation of disinfection systems. Where contamination problems are pervasive, or where multiple contaminants are present, the municipality may wish to explore the possible extension of water from a nearby community water system, or the creation of a new community water system. Before any such action is undertaken, the municipality's first responsibility is to address groundwater cleanup.

Pennsylvania does not require testing for new on-lot water systems to ascertain adequate water quality or yield, either prior to or as part of the well drilling process. However, DEP regulations relating to the siting of new on-lot sewage disposal systems have the effect of protecting groundwater quality to a certain degree. The DEP requires new on-lot sewage disposal systems to be set back at least 100 feet from any existing on-lot well, and encourages minimum lot sizes of at least one acre where on-lot sewage disposal systems are used. Lycoming County's Subdivision and land Development Ordinance stipulates that where groundwater problems are known to exist, or where anticipated levels of development may result in water supply problems, the Planning Commission may require the developer to demonstrate that a reliable, safe, and adequate groundwater supply exists to support the water usage demands of proposed subdivisions and land developments. While these measures will help protect water quality and availability in developing areas of the County; there are additional measures that municipalities can and should undertake to further protect their groundwater resources. These measures are explored in Chapters IV and VI.

IV. SYSTEM VIABILITY AND ALTERNATIVE SOLUTION STRATEGIES



A. INTRODUCTION

This chapter utilizes the water resources analysis of Chapter III to evaluate the existing and projected future viability of the County's community water systems. A viable water system is one that is self-sustaining and has the commitment and the financial, managerial and technical capability to reliably meet performance requirements on a long-term basis. The chapter also describes a wide variety of possible solution strategies that can be used to maintain and promote viability in these water systems. Finally, the chapter makes specific recommendations for stand-alone system improvements as well as regional strategies for enhancing water system viability.

B. COMMUNITY WATER SYSTEM VIABILITY

There are a variety of methods for assessing the existing and projected future viability of community water systems. The method selected must be meaningful in its usefulness and appropriate for application to the types of small community water systems found in Lycoming County. The 1996 Safe Drinking Water Act (SDWA) amendments require that water systems demonstrate financial, technical and management capacity to function as viable public water systems (Curry, 1998).

1. POTENTIAL ASSESSMENT METHODS

One approach to assessing small system viability is the "Dozen Questions" diagnostic (EPA, 1995). This approach, produced for the *AWWA Guidance Committee to Small Systems*, provides a procedure for evaluating existing water systems' abilities to meet current and future operating and financial requirements. The objective is to promote strategic planning among small system owners. The method consists of a series of detailed questions in 12 categories that define small system viability. Because of the extensive and confidential nature of some of the questions involved, addressing such issues as customer awareness, managerial competence and financial stability, the Dozen Questions diagnostic approach is primarily a tool to be used by system owners who are well motivated to assess, plan ahead and improve their systems. In a more streamlined format, where data is available and cooperation from water systems forthcoming, this approach can be used by outside parties to assess the viability of small community water systems. Many of the types of questions asked in the Dozen Questions diagnostic have been incorporated into the assessment method developed to evaluate Lycoming County's community water systems.

Another approach to assessing small system viability is the "Development of Benchmark Measures."(Apogee Research, 1997) This approach combines an examination of municipal social indicators relating to poverty, income, age and population growth, with a financial profile of the system, average water use and water quality information. These indicators are intended to gauge overall system stability. This approach is most useful where applied to systems that serve a high proportion of the municipality's population, but is less useful for small systems that might or might not share a common social profile with the municipality as a whole. In addition, this approach works only where financial records for water systems are maintained separate from financial records for other aspects of a development, and where those records are made available on request. Applicable components of the Benchmark Measures approach were also incorporated into the assessment method developed to evaluate Lycoming County's community water systems.

2. SELECTED ASSESSMENT METHOD

One quarter of Lycoming County's community water systems are municipal systems or authorities serving from a few hundred to thousands of persons. Nearly two-thirds of the County's water providers are mobile home parks, while the remaining consist of a variety of institutional uses and small developments. Financial data used in assessing the County's community water systems was drawn from a variety of sources, including a survey administered as part of this report (see Appendix X), a financial survey administered by the Northeast Rural Community Assistance Program for DEP, and year-end system financial reports (authorities), the PUC (investor-owned systems) and the consultant team (most municipal systems). For many systems, particularly mobile home parks, no financial data was available. On the other hand, useful data on system infrastructure and management were available through the DEP PADWIS database, Annual Water Supply Reports, and the regional DEP office. This data together with additional information generated from surveys was compared with DEP's Community Water System design standards as set forth in its Public Water Supply Manual-Part II and with as many applicable aspects of the Dozen Questions diagnostic and the Benchmark Measures as possible.

3. RATING CRITERIA

This section of the Plan evaluates the current and future anticipated capabilities and needs of the County's 37 community water systems by assigning various point values to 18 specific rating criteria, described in the boxed insets on the following pages. These criteria were developed by the consultant for the purpose of this study. While they are based primarily on DEP's Community Water System Design Standards together with applicable standards from the Dozen Questions diagnostic and Benchmark Measures, the numerical weightings and threshold points are the consultants. The rating criteria are not intended for purposes of comparing systems, but rather are meant to assist individual systems in identifying strengths and areas of needed attention. All community water systems are strongly encouraged to build on this initial evaluation by utilizing DEP's Self Assessment Guide, which permits a closer analysis of system management and finances than is possible I this study, to better gauge long-term system viability.

WATER SYSTEM CAPABILITY RATING CRITERIA

A. WATER SOURCES

1. Multiple/Dual/Single Water Sources

Each available water source reported was given credit up to a maximum of four points for systems with multiple sources. Systems with an emergency power generator, or a contractual arrangement for alternative water, or with existing interconnections with other systems were credited with up to two additional water sources. Systems not having 3 points for both current and future demands should be further evaluated for future improvements.

4 = Multiple water sources
3 = Three water sources
2 = Two water sources
1 = One water source

2. Safe Yield Compared to Water Demands

The combined safe yield from groundwater production sources was compared to current and projected future (Year 2020) average daily and peak daily demands values. Systems reporting water shortfalls in times of drought had one point deducted. Systems not having 1 point for current demands and 3 points or future demands should be further evaluated for improvements.

4 = Existing safe yield ≥ future peak daily demand
3 = Existing safe yield ≥ future average daily demand
2 = Existing safe yield ≥ current peak daily demand
1 = Existing safe yield ≥ current average daily demand
0 = Existing safe yield < current average daily demand

3. Main Production Source Out-of-Service

This represents the remaining water that would be available if the main production source were out-of-service. Systems not having 1 point for current demands and/or 3 points for future demands should be further evaluated for improvements.

3 = Remaining sources ≥ future average daily demand
2 = Remaining sources ≥ current peak daily demand
1 = Remaining sources ≥ current average daily demand
0 = Remaining sources < current average daily demand

4. Source Pumping Capacity

The existing raw water source pumping capacities were compared to both current and future water demands. System pumping capacities of dual or multiple sources were combined. Systems not having 2 points for current demands and/or 4 points for future demands should be further evaluated for improvement. Systems having 1 or 3 points may be acceptable if water storage is adequate to supply the peak daily demand and/or fire flow demands (if applicable). Refer to Section C-1.

4 = Existing pumping capacity ≥ future peak daily demand
3 = Existing pumping capacity ≥ future average daily demand
2 = Existing pumping capacity ≥ current peak daily demand
1 = Existing pumping capacity ≥ current average daily demand
0 = Existing pumping capacity < current average daily demand

B. WATER TREATMENT FACILITIES

1. Treated Water Quality

Treated water quality varies and depends on the specific chemical, biological, and physical contaminants in the water and their concentrations. Water quality must meet primary and secondary water quality standards prior to being distributed. Systems using groundwater which has been determined to be under or possibly under the direct influence of surface water may meet all water quality standards but may in the future be required to provide full filtration, which will be a significant expense. Systems not having 3 points for current water quality should be further evaluated for improvements.

4 = Water quality meets all primary and secondary standards routinely, no surface water influence
3 = Water quality meets all primary and secondary standards routinely, possible surface water influence
2 = Water quality meets all primary and secondary standards routinely, surface water influence
1 = Water quality primary and/or secondary standards compliance problem trends
0 = Water quality does not meet all primary and secondary standards routinely

C. FINISHED WATER STORAGE

1. Distribution Water Storage

Existing water storage was compared to the average and peak daily flow demand volumes for both the current and future time periods. Points were provided based on the volume of existing storage exceeding the calculated demand volumes. Water storage should be equivalent to or exceed one day's average water use depending on the total volume of water stored and the safe yield. The availability of an average daily storage volume was assumed to meet the system peak hourly demand. Systems not having 2 points for current demands and/or 4 points for future demands should be further evaluated for improvements.

5 = Existing storage ≥ future peak daily demand volume
4 = Existing storage ≥ future average daily demand volume
3 = Existing storage ≥ current peak daily demand volume
2 = Existing storage ≥ current average daily demand volume
1 = Existing storage < current average daily demand volume
0 = Existing storage < current peak-average demand volume (accumulated peak hourly demands)

2. Additional Fire Storage

Systems providing fire protection (see Section D-3) were evaluated for water needed for fire fighting by using the Insurance Services Office's (ISO) recommendations of 500, 1,000, and 1,500 gallons per minute for a 2 hour duration (60,000 gallons, 120,000 gallons, and 180,000 gallons respectively). Systems providing for additional fire storage for 2010 over that provided in Section C-1 above were given points as follows.

3 = Fire storage ≥ 180,000 gallons
2 = Fire storage ≥ 120,000 gallons
1 = Fire storage ≥ 60,000 gallons
0 = Fire storage < 60,000 gallons
NA = systems not providing fire protection

D. WATER DISTRIBUTION SYSTEM

1. Booster Pumping System(s)

Pumping equipment within a well house, treatment facility or distribution booster station used to convey water between the system's sources to distribution system components should be provided in duplicate. Systems that do not have a duplex arrangement are recommended to have a spare pump and motor available with other critical components. Systems not having 2 points for current and future demands should be further evaluated and considered for improvements.

2 = Duplex pumping unit installed or single pump with spare unit available
1 = Single pump system without spare unit available
NA = No booster pump systems required

2. Piping Systems Sized for Appurtenances

Distribution system piping should be properly designed and sized to support water system appurtenances such as fire hydrants and blow-off units. The minimum size of water main providing fire protection serving fire hydrants shall be 6" in diameter. Distribution systems not having 2 points for current piping should be evaluated and considered for improvements (refer to Section D-3).

2 = Proper piping size throughout system
1 = Proper piping size throughout part of system
0 = Piping size does not meet current minimum standards
NA = System does not support distribution system appurtenances

3. Distribution System Appurtenances

Distribution system appurtenances such as fire hydrants, standpipe valves, blow-off valves, and air release valves should be installed at critical system locations and distances. Systems should have isolation valves installed to isolate piping for repairs. All systems should have at least 1 point currently or be further evaluated for improvements.

2 = Fire hydrants installed
1 = Blow-off valves or flushing hydrant installed
0 = No blow-off valves or hydrants installed

4. Distribution System Pressure

Adequate system pressure is required during typical average and peak daily demand periods for proper system operation. Additionally, the distribution system must be able to provide a 20 psi residual pressure during a high flow event such as fire fighting. Systems that cannot provide adequate pressure during high flow events are at risk of cross-contamination, distribution system failure, and inability to support the high flow demand. Systems having 0 points or unknown pressures for current and future system standards should be further evaluated for improvements.

1 = Adequate pressure during high flow events
0 = Inadequate pressure during high flows

5. Cross-Connection Prevention

Cross-connections allow potentially contaminated water to enter the potable water distribution system. Cross-connection equipment is required to be installed and cross-contamination prevention plans are required for all systems.

1 = Cross-connection equipment installed and/or cross-contamination prevention plan prepared
0 = No cross-connection equipment installed and no cross contamination plan prepared.

E. WATER SYSTEM MANAGEMENT

1. System Size

The DEP defines small systems as serving 3,300 or fewer people, medium systems as serving between 3,301 and 10,000 persons, and large systems as serving over 10,000 persons. The larger the system, the more likely economies of scale apply. However, no points are required in regard to system viability.

2 = System serves > 10,000 persons
1 = System serves ≥ 3,301 and ≤ 10,000 persons
0 = System serves ≤ 3,300 persons

2. Certified Water System Operators

Water systems must be operated and maintained by a primary and secondary state certified operator. Points were given for certified operators responsible for each system. Systems must have 2 points for current and future operations.

2 = Two state certified operators
1 = One state certified operator
0 = No state certified operator

3. Water System Record Keeping

Records of water system components, plans, and programs must be developed, submitted to DEP, and maintained by each water system. An Operations and Maintenance Plan (O&M Plan) and Emergency Response Plan (ERP) should be developed by the water system's engineer, operator or other responsible individual(s). The Annual Water Supply Report (AWSR) should be prepared and submitted annually to the DEP. Each required record set was given 1 point. Systems should have 3 points for current system operations.

3 = O&M Plan, ERP and AWSR available
2 = Two of the 3 required documents available
1 = One of the 3 required documents available
0 = None of the 3 required documents available

4. Source Water Protection Program

The 1996 SDWA amendments require public water source recharge areas be assessed for locations and types of possible contaminants and the vulnerability of the source to those contaminants. Systems should develop a wellhead protection program or implement protective procedures and actions to minimize potential bacteriological and/or chemical contamination. Systems with DEP-approved wellhead protection plans were assigned 2 points while systems with other wellhead protection measures in effect were assigned 1 point. Systems should have 2 points for future operations.

2 = DEP-approved wellhead protection program in effect
1 = Other wellhead protection measures or action have been taken or developed
0 = No program, measures or action have been developed

F. WATER SYSTEM FINANCES

1. Financial Assessment

Financial assessment is critical in determining future water system viability. Systems were evaluated for reasonable rates, reasonable operating expenses per 1,000 gallons, reasonable operating revenues per connection, reasonable operating ratio of revenues to expenses, annual water budget, capital water budget and a water accounting system. Systems were assigned one point for each criterion. Systems should have 4 points for current operations and 5 points for future operations..

7 = All seven financial criteria met
6 = Six financial criteria met
5 = Five financial criteria met
4 = Four financial criteria met
3 = Three financial criteria met
2 = Two financial criteria met
1 = One financial criterion met
0 = None of the financial criteria met
NA = Financial records for water system not separate from other services provided

2. Social Indicators

Various social indicators provide background information by which to evaluate the relative affordability of water service to households. Water service is considered to be less affordable to households in municipalities in which 1) the percent of families living below the poverty line is greater than 9.5% and 2) the median household income is less than 90% of that for the State.

2 = No indicators present
1 = One indicator present
0 = Both indicators present

It must be noted that future criteria are being established by the 1996 SDWA amendments and subsequent rule-making by the U.S. EPA. Where applicable, information related to new or changing requirements is noted in this section.

This study's rating criteria establish a maximum number of possible points for each criterion. A minimum number of points for each criterion are established as current and future thresholds of adequacy. The maximum number of points that a water system can attain is 54.

NA indicates the inapplicability of three criteria to certain systems; these include additional fire storage where there are no hydrants, booster pumps where no stations exist and piping adequacy where there are no appurtenances. NA as it applies to financial criteria indicates that this information is not available for systems that do not account for water separate from other expenses. In addition to rating individual criteria, six system components – source, treatment, storage, distribution, management, and finance – are rated separately for each

system to provide a closer look at individual system strengths and weaknesses. To demonstrate future compliance for each system component, that component must score the minimum number of points needed by 2020 as indicated on Table 19. Strong systems exceed future year point criteria for the particular component. Adequate systems meet current and future year point criteria. Fair systems meet current but not future year point criteria and weak systems do not meet current year point criteria. Individual system component assessments are illustrated in Table 20. The management and financial components may be weighed more heavily by individual systems or the County in evaluating potential solution strategies, if desired. However, projected future viability should also consider the extensiveness of needed structural improvements. Borderline-viable systems may be able to finance limited structural improvements, whereas they may be unable to provide extensive improvements.

4. SYSTEM RATINGS

Table 19 sets forth the assigned community water system ratings. The following table provides corresponding abbreviations for each of the County's community water systems.

AB	ABC #2 MHP	MN	Montoursville Boro Waterworks
AL	Allenwood Fed. Prison Camp	ML	Mountain Laurel MHP
AM	American Tempo Village Park	MB	Muncy Boro Water Department
BA	Barto's Trailer Court	MS	Muncy State Correctional Inst.
BI	Bittner's MHP	OL	Oak-Lynn Manor MHP
CA	Carpenters MHP	OR	Orchard MHP
CG	Cogan Valley MHP	PI	Pinecrest Village MHP
CL	Collomsville Mutual Waterworks	PL	Pleasant Pines MHP
FA	Fairlawn Trailer Court	RA	Ralston Area Joint Authority
FO	Foxcroft Manor MHP	RB	Roaring Branch Waterworks
HA	Harvest Moon Trailer Court	TV	Tiadaghton View MHP
HE	Heatherbrooke Estates MHP	TE	Timberend Estates MHP
HI	Hidden Valley MHC	TH	Twin Hills MHP
HU	Hughesville Borough Water Authority	VV	Vali-View MHP
JS	Jersey Shore Joint Water Authority	VI	Village Water Incorporated
LI	Limestone Twp. Water Authority	WT	Waterville Water Association
LO	Loyalsock MHP	WI	Wilawan MHP
ME	Meadowbrook MHP	WP	Williamsport Mun. Water Authority
MO	Montgomery Boro W & S Authority		

Table 19
Community Water Systems Viability Ratings
County Water Supply Plan
Lycoming County Planning Commission

Criteria	Points Needed[1]			Community Water System[1]																	
	Possible	Current	Year 2020	AB	AL	AM	BA	BI	CA	CG	CL	FA	FO	HA	HE	HI	HU	JS	LI	LO	ME
A. Water Sources																					
1. Number of Sources	4	3	3	1	2	1	2	1	2	2	1	1	2	4	2	1	3	4	4	1	3
2. Safe Yield	4	1	3	4	3	4	4	4	4	4	1	4	4	4	4	3	4	4	3	4	4
3. Source Out of Service	3	1	3	0	0	0	0	0	3	3	0	0	3	3	U	0	2	3	2	0	3
4. Source Pumping Capacity	4	2	4	U	4	4	4	4	4	4	4	4	4	4	4	U	4	4	2	4	4
B. Water Treatment																					
1. Water Quality	4	3	3	4	1	4	4	4	4	3	4	4	3	4	4	4	1	4	4	4	4
C. Water Storage																					
1. Distribution Storage	5	2	4	1	5	0	1	1	2	0	5	0	0	5	4	5	2	5	5	0	2
2. Additional Fire Storage	3	NA/1	NA/1	NA	3	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	3	0	NA	NA
D. Water Distribution																					
1. Booster Pumps	2	NA/2	NA/2	1	2	NA	1	2	NA	2	NA	NA	2	2	2	2	U	2	NA	NA	NA
2. Piping	2	NA/1	NA/2	NA	2	NA	NA	NA	NA	NA	1	NA	NA	NA	NA	NA	2	1	1	NA	NA
3. Appurtenances	2	1	1	1	2	0	0	1	0	1	2	0	0	-	0	0	2	2	2	0	1
4. Pressure	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5. Cross-Connection	1	1	1	0	0	0	0	0	1	1	0	0	0	1	0	0	1	1	0	0	1
E. System Management																					
1. System Size	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
2. Operators	2	2	2	1	0	0	0	0	1	1	0	0	1	0	1	1	1	2	1	0	1
3. Recordkeeping	3	3	3	U	2	1	2	U	3	1	0	U	U	U	U	U	3	3	U	3	3
4. Source Protection	2	0	2	-	0	-	0	-	0	1	0	-	-	-	-	-	1	1	-	0	0
F. Water System Finances																					
1. Financial Assessment	7	NA/4	NA/5	0	0	0	0	0	0	0	5	0	0	0	0	0	7	7	5	0	0
2. Social Indicators	2	0	0	0	2	2	2	1	1	2	2	0	2	1	2	1	1	0	2	2	2

Criteria	Points Needed[1]			Community Water System[2]																	
	Possible	Current	Year 2020	MO	MN	ML	MB	MS	OL	OR	PI	PL	RA	RB	TV	TE	TH	VV	VI	WT	WI	WP
A. Water Sources																						
1. Number of Sources	4	3	3	4	4	2	4	4	1	3	4	1	2	1	3	2	2	1	2	1	1	4
2. Safe Yield	4	1	3	4	4	4	4	4	4	4	U	4	4	3	4	4	4	4	3	3	4	4
3. Source Out of Service	3	1	3	3	3	3	3	2	0	3	U	0	3	0	3	0	3	0	3	0	0	3
4. Source Pumping Capacity	4	2	4	4	3	4	4	3	4	4	U	4	4	4	4	4	4	4	4	4	4	4
B. Water Treatment																						
1. Water Quality	4	3	3	1	4	4	3	2	4	4	4	4	2	4	4	4	4	4	4	3	4	4
C. Water Storage																						
1. Distribution Storage	5	2	4	5	4	U	5	5	1	1	4	0	0	5	0	U	0	1	2	5	0	5
2. Additional Fire Storage	3	NA/1	NA/1	3	0	U	3	3	NA	NA	NA	NA	1	NA	NA	U	NA	NA	NA	0	NA	3
D. Water Distribution																						
1. Booster Pumps	2	NA/2	NA/2	U	U	NA	2	2	2	2	NA	1	NA	NA	NA	NA	NA	2	2	NA	NA	2
2. Piping	2	NA/1	NA/2	2	U	NA	U	U	NA	NA	NA	NA	1	NA	-	-	U	-	NA	0	NA	1
3. Appurtenances	2	1	1	2	2	1	2	2	0	1	0	0	2	0	-	-	-	-	1	2	0	2
4. Pressure	1	1	1	0	1	0	U	1	1	1	1	U	1	1	-	-	-	-	0	1	1	0
5. Cross-Connection	1	1	1	0	1	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	1	1
E. System Management																						
1. System Size	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
2. Operators	2	2	2	2	2	1	2	2	1	0	1	0	2	2	1	0	1	1	1	1	0	3
3. Recordkeeping	3	3	3	2	3	2	1	1	U	3	3	1	2	2	1	1	1	U	3	1	3	2
4. Source Protection	2	0	2	1	2	0	1	0	-	1	1	0	1	1	-	-	-	-	0	0	1	1
F. Water System Finances																						
1. Financial Assessment	7	NA/4	NA/5	6	6	0	3	0	0	0	0	0	4	2	0	0	0	0	3	4	0	7
2. Social Indicators	2	0	0	0	2	2	1	2	2	2	2	2	0	0	2	2	2	2	2	1	1	0

1 for a determination of strong system status
2 system names abbreviated alphabetically
U = unknown values
- = information not provided by water systems
NA = not available

Table 20 provides a comparative assessment of the six components comprising each community water system. For "water source", 9 are rated strong, 8 adequate, 16 fair, and 4 weak. For "water treatment", 29 systems are judged to be strong, four adequate, one fair and three weak. Nine systems are rated strong for "water storage", while five are rated adequate, four fair and 19 weak. For "water distribution", no systems are judged to be strong, five are considered adequate, 11 are fair and 21 weak. Finally, three systems are rated strong in "system management", none adequate, 5 fair, and 29 weak. Finally, for Finances, 7 systems are rated strong, 2 adequate, 2 fair, and 26 weak. Major component shortcomings are in the areas of storage, distribution, and management.

C. ALTERNATIVE SOLUTION STRATEGIES

Strategies for enhancing the viability of community water systems include both individual system and regional strategies. Under the system approach, each community water system addresses its own problems through internal changes. Under the regional approach, cooperative solutions involving multiple systems are discussed.

1. EXISTING SYSTEM STRATEGIES

Structural Improvements - Table 21 sets forth recommended structural system improvements for each community water system together with their estimated costs. These improvements are needed to meet minimum system design standards to correct structural inadequacies identified in the preceding assessment. Estimated costs are based on the R. S. Means Company, Inc's *Building Construction Cost Data*, 1996 48th Edition and the U.S. EPA's *Very Small Systems - Best Available Technology Cost Document*, September, 1992. An annual inflation factor of 2% and estimates derived from recently completed construction projects are used to estimate these costs. Improvement categories include water source, treatment, storage, and distribution. Individual improvements are indicated by use of a code that is linked to the Water System Viability Criteria descriptions and on Table 19. System abbreviations are used that correlate with those in Table 19. Total estimated costs for recommended improvements for each system are provided in the far right column of Table 21. While the ratings shown in Table 19 are the primary basis for the recommended improvements, individual system strengths and weaknesses were also considered. For instance, certain systems with inadequate storage but with more than sufficient safe yield to the year 2020 were not recommended for additional storage. (The Water System Summary sheets in Appendix A provide individualized assessments of each system's future needs).

Eighteen of the County's community water systems were identified as needing water source improvements with costs estimated to total at least $781,000. Nine systems need water treatment improvements totalling at least $186,00. Sixteen systems could be improved through the provision of additional storage at an estimated minimum cost of $1,463,500. Sixteen systems need improvements to their distribution systems for costs estimated at $48,000. Including a factor of 25% for engineering, legal, administrative and contingency costs, the total estimate for needed structural improvements to the County's systems is at least $2,927,375.

Table 20
Community Water System Component Assessments
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	Source				Treatment				Storage				Distribution				Management				Finances			
	S	A	F	W	S	A	F	W	S	A	F	W	S	A	F	W	S	A	F	W	S	A	F	W
ABC #2 MHP				X				X				X				X				X				X
Allenwood Fed. Prison Camp			X					X	X					X						X				X
American Tempo Village Park			X					X				X				X				X				X
Barto's Trailer Court			X					X				X				X				X				X
Bittner's MHP			X					X				X			X					X				X
Carpenters MHP		X						X			X				X					X				X
Cogan Valley MHP		X						X				X		X						X				X
Collomsville Mutual Waterworks				X				X		X					X					X	X			
Fairlawn Trailer Court			X					X				X				X				X				X
Foxcroft Manor MHP		X						X				X				X				X				X
Harvest Moon Trailer Court	X							X	X						X					X				X
Heatherbrooke Estates MHP			X					X		X						X				X				X
Hidden Valley MHC				X				X	X							X				X				X
Hughesville Boro Water Auth.		X				X						X			X				X		X			
Jersey Shore Area Joint Water Auth.	X				X				X					X			X				X				
Limestone Twp. Water Auth.			X					X		X					X					X	X			
Loyalsock MHP			X					X				X				X				X				X
Meadowbrook MHP	X						X				X			X						X				X
Montgomery Boro W & S Auth.	X						X		X							X			X		X			
Montoursville Boro Waterworks	X				X						X					X	X				X			
Mountain Laurel MHP		X						X				X				X				X				X
Muncy Boro Water Department	X							X	X							X				X			X	
Muncy State Correctional Inst.		X						X	X						X					X				X
Oak-Lynn Manor MHP			X					X				X				X				X				X
Orchard MHP	X							X				X		X						X				X
Pinecrest Village MHP				X			X			X					X				X					X
Pleasant Pines MHP			X					X				X				X				X				X
Ralston Area Joint Auth.		X						X				X			X				X				X	
Roaring Branch Waterworks			X					X	X							X			X					X
Tiadaghton View MHP	X							X				X				X				X				X
Timberend Estates MHP			X					X				X				X				X				X
Twin Hills MHP		X						X				X				X				X				X
Vali-View MHP			X					X				X				X				X				X
Village Water Incorporated			X					X			X					X				X		X		
Waterville Water Association			X					X		X						X				X		X		
Wilawan MHP			X					X				X			X					X				X
Williamsport Mun. Water Auth.	X				X				X						X		X				X			
County Totals	**9**	**8**	**16**	**4**	**3**	**1**	**3**	**30**	**9**	**5**	**4**	**19**	**0**	**5**	**11**	**21**	**3**	**0**	**5**	**29**	**7**	**2**	**2**	**26**

Notes:
S = Strong systems exceed future year point criteria.
A = Adequate systems meet current and future year point criteria.
F = Fair systems meet current but not future year point criteria.
W = Weak systems do not meet current year point criteria.
For all systems, individual subcomponents should be examined for adequacy.

Table 21
Identified Community Water System Improvements Needed to Meet Minimum System Design Standards
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	Water Source		Treatment		Storage		Distribution		Subtotal Costs[2]	Engineering, Legal, Admin. Contigency (+25%)	Total Costs[2]
	Improvement	Cost[1]	Improvement	Cost	Improvement	Cost	Improvement	Cost			
ABC #2 MHP	2nd well	$42,500			2,000 gallons	$9,000			$51,500	$12,875	$64,375
Allenwood Fed. Prison Camp	2nd well	$52,500	Eval						$52,500	$13,125	$65,625
American Tempo Village Park	2nd well	$42,500			5,000 gallons	$35,000	Blowoff valve	$3,000	$80,500	$20,125	$100,625
Barto's Trailer Court	2nd well	$42,500					Blowoff valve	$3,000	$45,500	$11,375	$56,875
Bittner's MHP	2nd well	$42,500			1,500 gallons	$12,000			$54,500	$13,625	$68,125
Carpenters MHP							Blowoff valve	$3,000	$3,000	$750	$3,750
Cogan Valley MHP	Pumps	$18,000	Generator	$30,000	25,000 gal (alt)	$57,000			$48,000-75,000	$18,750	$93,750
Collomsville Mutual Waterworks	2nd well	$43,500							$43,500	$10,875	$54,375
Fairlawn Trailer Court	2nd well	$42,500					Blowoff valve	$3,000	$45,500	$11,375	$56,875
Foxcroft Manor MHP					10,000 gallons	$33,000	Blowoff valve	$3,000	$36,000	$9,000	$45,000
Harvest Moon Trailer Court									$0	$0	$0
Heatherbrooke Estates MHP							Blowoff valve	$3,000	$3,000	$750	$3,750
Hidden Valley MHC	2nd well	$42,500					Blowoff valve	$3,000	$45,500	$11,375	$56,875
Hughesville Boro Water Auth.					350,000 gallons	$683,000			$683,000	$170,750	$853,750
Jersey Shore Area Joint Water Auth.									$0	$0	$0
Limestone Twp. Water Auth.	3rd well	$47,500							$47,500	$11,875	$59,375
Loyalsock MHP	2nd well	$42,500	Generator	$18,000			Blowoff valve	$3,000	$63,500	$15,875	$79,375
Meadowbrook MHP									$0	$0	$0
Montgomery Boro W & S Auth.									$0	$0	$0
Montoursville Water Company									$0	$0	$0
Mountain Laurel MHP	Well / safe yield	$42,500							$42,500	$10,625	$53,125
Muncy Boro Water Company									$0	$0	$0
Muncy State Correctional Inst.									$0	$0	$0
Oak-Lynn Manor MHP	2nd well	$42,500	Generator	$18,000	12,000 gal (alt)	$60,000	Blowoff valve	$3,000	$63,500-105,500	$26,375	$131,875
Orchard MHP			Generator	$20,500	18,000 gal (alt)	$58,000			$20,500-58,500	$14,625	$73,125
Pinecrest Village MHP	2nd well	$42,500					Blowoff valve	$3,000	$45,500	$11,375	$56,875
Pleasant Pines MHP	2nd well	$42,500	Gen (alt)	$18,000	3,000 gallons	$18,000	Blowoff valve	$3,000	$36,000	$9,000	$45,000
Ralston Area Joint Auth.									$0	$0	$0
Roaring Branch Waterworks	2nd well	$42,500					Blowoff valve	$3,000	$45,500	$11,375	$56,875
Tiadaghton View MHP			Generator	$25,000	6,000 gallons	$25,000	Blowoff valve	$3,000	$53,000	$13,250	$66,250
Timberend Estates MHP			Gen (alt)	$20,500	25,000 gallons	$85,000			$20,500-85,000	$21,250	$106,250
Twin Hills MHP					20,000 gallons	$52,000	Blowoff valve	$3,000	$55,000	$12,500	$87,500
Vali-View MHP	2nd well	$42,500	Generator	$18,000	15,000 gal (alt)	$60,000	Blowoff valve	$3,000	$123,500	$30,875	$154,375
Village Water Incorporated					85,000 gallons	$166,000			$166,000	$41,500	$207,500
Waterville Water Association	2nd well	$42,500			30,000 gallons	$78,000			$120,500	$30,125	$150,625
Wilawan MHP	2nd well	$42,500	Generator	$18,000	10,000 gal (alt)	$32,500	Blowoff valve	$3,000	$63,500-78,500	$19,500	$98,000
Williamsport Mun. Water Auth.									$0	$0	$0
County Totals		**$799,000**		**$186,000**		**$1,463,500**		**$48,000**		**$584,875**	**$2,949,875**

[1]Note - Cost estimate for Hydrology Study, 8" dia., 500' deep well bore, pump test, well pump, and 500 LF of 4" Force Main.
[2]Note - Engineering, Legal, Admin, and Contingency and Total System Costs based on highest range value.
General Note - System improvement(s) could be accomplished with one or more identified alternatives. Therefore, a budget estimate range is provided for these alternatives. A detailed engineering review should be accomplished by each system to determine the optimum improvement alternative for meeting future water system design standards.
General Note - "Alt" - Item is listed as an alternative improvement method for correcting deficiency. Detailed evaluation and planning should be completed by system owner.
General Note - "Eval" - Item identified should be further evaluated by system owner to determine appropriate corrective action and cost budget.

Table 21 (Supplement)
Water System Identified Improvements Needed for Reliable Service
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	Water Source		Treatment		Storage		Distribution		Subtotal Costs	Engineering, Legal, Admin. Contigency (+25%)	Total Costs
	Improvement	Cost	Improvement	Cost	Improvement	Cost	Improvement	Cost			
ABC #2 MHP									$0	$0	$0
Allenwood Fed. Prison Camp									$0	$0	$0
American Tempo Village Park									$0	$0	$0
Barto's Trailer Court									$0	$0	$0
Bittner's MHP									$0	$0	$0
Carpenters MHP									$0	$0	$0
Cogan Valley MHP									$0	$0	$0
Collomsville Mutual Waterworks									$0	$0	$0
Fairlawn Trailer Court									$0	$0	$0
Foxcroft Manor MHP									$0	$0	$0
Harvest Moon Trailer Court									$0	$0	$0
Heatherbrooke Estates MHP									$0	$0	$0
Hidden Valley MHC									$0	$0	$0
Hughesville Boro Water Auth.	Source	$240,000	pH Adjust	$28,000			Extensions	$1,400,000	$1,668,000	$417,000	$2,085,000
Jersey Shore Area Joint Water Auth.	Note 1	$420,000	Note 1	$120,000	Note 1	$3,000,000	Note 1	$1,360,000	$4,900,000	$1,225,000	$6,125,000
Limestone Twp. Water Auth.	Note 2	$1,000,000			Note 2	$150,000	Note 2	$1,500,000	$2,650,000	$662,500	$3,312,500
Loyalsock MHP									$0	$0	$0
Lycoming Mall	PIP	TBD							TBD	TBD	TBD
Meadowbrook MHP									$0	$0	$0
Montgomery Boro W & S Auth.			Note 3	$80,000	1MG Tank	$1,000,000	Note 3	TBD	$1,080,000	$270,000	$1,350,000
Montoursville Water Company							PIP	$360,000	$360,000	$90,000	$450,000
Mountain Laurel MHP									$0	$0	$0
Muncy Boro Water Company							Extensions	$58,000	$58,000	$14,500	$72,500
Muncy State Correctional Inst.									$0	$0	$0
Oak-Lynn Manor MHP									$0	$0	$0
Orchard MHP									$0	$0	$0
Pinecrest Village MHP									$0	$0	$0
Pleasant Pines MHP									$0	$0	$0
Ralston Area Joint Auth.			PIP	$5,500	Replace Storage	$350,000			$355,500	$88,875	$444,375
Roaring Branch Waterworks	Source	$25,000							$25,000	$6,250	$31,250
Tiadaghton View MHP									$0	$0	$0
Timberend Estates MHP									$0	$0	$0
Twin Hills MHP									$0	$0	$0
Vali-View MHP									$0	$0	$0
Village Water Incorporated									$0	$0	$0
Waterville Water Association									$0	$0	$0
Wilawan MHP									$0	$0	$0
Williamsport Mun. Water Auth.	Note 4	$552,000	Note 4	$5,668,000	Note 4	$828,000	Note 4	$1,080,000	$8,128,000	$2,032,000	$10,160,000
County Totals		**$2,237,000**		**$5,901,500**		**$5,328,000**		**$5,758,000**	**$19,224,500**	**$4,806,125**	**$24,030,625**

Note 1: Source - Well Pump Control, Supply Pipe, Dam; Treatment - Sed. Basin; Storage - Tank; Distribution - Mains & Pipes.
Note 2: Source - Raw Water Reservoir; Storage - 142,000 Gallon Tank; Distribution – Looping and Hydrants.
Note 3: Treatment - Potential Well 2 nitrate removal; Distribution - Pumping to improve pressure and pipe extensions costs not developed.
Note 4: Source - Watershed Protection, Generator, Wellfield; Treatment - Wellfield, Counter, Pipeline; Storage - Tank; Distribution - Model, Pumping Station, SCADA, Valves, Mains.
Gen Note - Engineering, Legal, Admin, and Contingency and Total System Costs determined from highest value of range.
Gen Note - PIP = Improvement Project in Progress (planning, design, or construction).
Gen Note - TBD = Cost estimate To Be Determined or provided by Water System upon completion of planning and design phases.

System surveys and visits indicate that several systems have identified various additional structural improvements as needed for reliable service, together with projected costs. In order to assure standardized recommendations based on this Plan's evaluations, these recommendations for improvements, totaling $24,060,000, are identified separately on Table 21 (Supplement).

Management Improvements - In addition to recommended physical system improvements, various management improvements would benefit the majority of the County's community water systems. System operations and recordkeeping, particularly for smaller water providers, are not always in compliance with DEP regulations. System management can be improved through various restructuring options, as summarized in the inset below.

SYSTEM RESTRUCTURING OPTIONS

Strategy	Examples	Applicability
· Internal Changes	· report/recordkeeping · operations · structural improvements · financing	· Where systems are viable.
· Informal/Formal Cooperation	· bulk/regional/discount purchase of supplies · shared/loaned/equipment & supplies · operator's association · municipal assistance · cooperatives	· Where systems desire increased efficiency/reduced costs.
· Contractual Assistance	· operations & maintenance · circuit rider/regionalized O & M & lab services · other professional service · interconnections · bulk water purchase · direct service by another system · satellite management · third-party management	· Where specialized or regular assistance is desired.
· Joint Powers Agencies	· joint service areas · consolidation of systems · centralized management · County/municipal authority	· Where two or more systems can be strengthened by combining system attributes or jointly addressing deficiencies.
· Ownership Transfer	· public system acquisition · private viable system acquisition · annexation	· Where system is non-viable.

Currently, most, if not all of the County's 37 community water systems address their own needs independently through *internal changes*. This works well for some larger water systems, but can be costly for smaller systems that do not enjoy similar economies of scale.

Informal/Formal Cooperation is an approach that could be productively used within Lycoming County. Many of the smaller community water systems could benefit from shared purchasing arrangements and shared contracting of services, such as for certified operators. Such arrangements could reduce operating costs while maintaining system autonomy.

Contractual Assistance is used primarily for services and is fairly common on an individual-system basis within the County. Procurement of services could be undertaken regionally for increased cost savings. Such assistance could also play an expanded role, such as in the third-party management of a troubled system.

Joint Powers Agency involves the creation of a new entity or authority, such as a County-wide authority, to serve member water systems. Such an entity can address major system improvements that are beyond the ability of a single water system to undertake or that are too costly. Ideally, member systems should be located close enough to be physically interconnected. The Lycoming County Water and Sewer Authority may be a possible consideration for such assistance.

Ownership Transfer is often the best option for systems at risk. Such a transfer can infuse troubled systems with needed expertise and financing to back major system improvements that would otherwise not occur.

In many cases, community water systems may need to implement multi-faceted restructuring, or more than one type of restructuring option at a time. Specific recommendations for management improvements are made under the Regional Strategies section that follows later in the chapter.

2. NEW SERVICE STRATEGIES

There are several types of new service strategies that could be implemented by Lycoming County and its communities to meet new water demands outside of the service areas of existing community water systems. Each of these strategies is discussed with respect to impact on local aquifers, relative contamination risks, sufficiency of groundwater quality and quantity, management and/or operational challenges, approval from regulatory agencies, and applicability of well construction and abandonment considerations.

Extensions – The extension of service lines from existing CWSs to serve new or remedial development should be the preferred method of new service provision throughout the County, particularly when planned growth is adjacent or nearby and where existing CWSs have ample source yield and storage capacity. Extensions to serve new or remedial development should be undertaken only where they meet DEP and ISO fire standards. While extensions outside municipal boundaries may trigger PUC regulations, they can also broaden the system rate base and lower costs. Extensions may or may not be cost-effective, depending on distance involved, topography, location of system components, willingness of users to pay and density of development, among other considerations. Extensions are most cost-effective in areas with permitted development densities of at least three units per acre. They are also most cost-effective where public sewer is provided simultaneously. Typically, public sewer and water extensions are financed by private developers. The beneficiaries of extensions for remedial purposes should recognize that they will need to pay a reasonable cost for hook-ups. Municipalities should be strongly encouraged to help fund extensions to areas in need of remedial water service. Municipalities should also be encouraged to adopt adequate public facilities ordinances or concurrency requirements to assure that water lines

intended to serve new development are in the ground prior to or concurrent with development. The DEP requires all municipalities to develop and adopt Act 537 Sewage Facilities Plans to address the planned future treatment of sewage within municipalities. Planned sewer service has implications for the extension of public water lines. Where developers are unable to receive assurance of available sewage plant capacity, they may be forced to build on larger lots to accommodate on-lot septic systems. Such large lots will effectively preclude the potential extension of public water to these sites. Thus, it is critical that public sewer and water planning be coordinated for extensions to be attractive, or even possible, options for developers.

Interconnections - New interconnections are most likely to be needed by water systems that need to supplement or replace the water supplied to the communities or developments that they serve. Depending on the size, scale and resources of these developments, interconnections are most cost-effective for systems that lie within about one mile of each other. Greater distances involve not only higher costs, but often raise serious concerns regarding the extension of lines through large land areas that lie outside areas designated for growth and development in applicable comprehensive plans. Water systems with surplus water and system capacity should be encouraged to consider the water needs of their neighbors and the possibility of a mutually-beneficial relationship including a water interconnection. New interconnections for contingency planning purposes alone can provide a valuable benefit for all participating parties by assuring access to a backup water supply in the event of an emergency. Interconnections require the approval of DEP.

New Community Water Systems – New community water systems that service 25 persons or more present a lower risk of contamination because they are legally required to be properly sited and constructed. New CWSs must be grouted, effectively preventing the well hole from acting as a conduit for contaminants at the surface of the land from reaching the groundwater. Additionally, new standards require Zone I areas (within 100-400 feet of the wellhead) to be under the direct management and control of the CWSs. Although these new systems must meet regulatory standards, the quality and quantity of groundwater will ultimately depends on subsurface geology and groundwater quality in the vicinity of the source well. However, water quality tends to be higher because these systems must monitor groundwater quality and treat water where appropriate. These systems are also permitted to withdraw only as much groundwater as safe yield projections indicate can be sustained, thereby protecting the aquifer as well as providing a reliable water supply for clients. Finally, regulatory agencies may provide funding through grants for the installation of community water systems. The operational or management costs of community water systems tend to be more expensive and will vary depending on system size. A business plan is a required part of a construction permit application for new CWSs. This plan must show that the system will have the technical, managerial and financial capacity to comply with all Safe Drinking Water requirements over time.

Noncommunity Water Systems - Noncommunity water systems are public systems that serve non-residential populations of 25 or more connected with commercial, industrial, institutional, and seasonal uses. Such systems frequently exist to serve a

single facility. Often, though not always, they are located some distance from CWSs, which otherwise could provide the same service. The finished water quality requirements for noncommunity water systems are the same as those for CWSs. Groundwater quantity and quality provided by such systems depends upon local contaminant threats, aquifer withdrawal and subsurface geology. Noncommunity water systems are regulated, but to a lesser degree than CWSs. Noncommunity water systems are generally less expensive to construct and maintain than community water systems. Such systems should be discouraged where CWSs could provide the same service.

Non-Public Water Systems

• *Non-Residential Self-Suppliers* – Self-suppliers are private systems that serve fewer than 25 persons. They typically supply water for industrial, commercial, non-residential, institutional, agricultural and seasonal uses, and frequently serve a single facility. Often, though not always, they are located at some distance from CWSs. The water quality requirements of these systems vary depending on water use. Groundwater quantity and quality provided by such systems depend upon local contaminant threats, aquifer withdrawal, surface water quality and subsurface geology. Self-suppliers that withdraw more than 100,000 gpd in groundwater are subject to review by the Susquehanna River Basin Commission. Allocations for surface water withdrawals from streams are not regulated by the DEP. Self-supplying systems are generally less expensive to construct and maintain than are noncommunity water systems.

Because the great majority of water withdrawn by self-suppliers is not intended for human consumption, surface water sources, including streams and ponds, are frequently used. Farmers, especially, rely on runoff water they collect in ponds for many of their water needs. It is important that they be able to continue to rely on this water source with a minimum of regulation. An added benefit of farm pond creation is their potential use for dry hydrants for fire fighting purposes. The availability of pond water for fire fighting can provide ready access to water in remote areas and also conserves the more costly, treated CWS water for uses that require potable water. Water conservation on farms should be promoted, particularly through the use of trickle irrigation.

In some parts of the County, high water use by self-suppliers, especially golf courses, can reduce water yields for adjacent on-lot wells during dry weather. In these areas, maximum recharge of groundwater should be encouraged and new consumptive water users discouraged. One technique for maximizing recharge is the use of spray irrigation from water or wastewater treatment plants, which otherwise would be released to streams. Where such uses are close by, their interconnection to self-suppliers can be mutually beneficial.

• *Small Residential Systems* - Small residential water systems are private water systems that serve fewer than 15 connections or 25 people. These systems are not regulated by government agencies. Wells are typically ungrouted and are therefore at risk of groundwater contamination from nearby septic tanks and other contaminants from agricultural, residential, commercial and industrial activities. The sufficiency of groundwater quality and quantity may be variable and often depends upon withdrawal by

other sources from the aquifer in the surrounding area, as well as the subsurface geology. Small systems are generally less expensive than community water systems to construct and maintain. Additionally, due to new DEP requirements that pertain to the construction and maintenance of community water systems, as well as rigorous new EPA water quality standards, developers of small subdivisions may find small water systems increasingly attractive in the future. However, these systems have all of the disadvantages of on-lot water systems in that they are completely unregulated and vulnerable. In addition, residents of such subdivisions may assume that because they do not have on-lot systems, they need not worry about groundwater quality or yield.

Small systems have a poor track record of adequate maintenance and should be discouraged. Municipalities should provide incentives for landowners and developers to either interconnect with existing, or develop new community water systems. These systems should be designed to serve other planned development sites. The County and municipalities should work together to identify and foster strategic growth areas. Where County-designated growth areas exist, municipalities should know where these areas are. Landowners and potential developers should be approached before they submit preliminary plans, while their plans may still be influenced. Incentives might include municipal assistance in funding or maintenance, additional development rights or a combination of the two. Landowners should also be made aware of DEP funding sources.

• *On-lot Residential Water Wells* - On-lot water wells are exposed to a high contamination risk from on-lot septic systems, which are often in close proximity to them. These wells are nearly always ungrouted, and may be contaminated by nearby agricultural, residential, commercial and industrial activities. On-lot water wells are the least expensive type of water system to construct and maintain. However, they have high environmental costs. For example, each new on-lot well is a potential conduit for contaminants to enter the groundwater. In addition, residences and other uses may be built in areas with insufficient water yields, especially in times of drought, which can cause serious problems for landowners. These systems are not regulated by the government. The sufficiency of on-lot groundwater quality and quantity depends upon local contaminant threats, surrounding aquifer withdrawal and subsurface geology. The combined effects of numerous on-lot wells, or a proliferation of new wells, could adversely impact water quality and yield.

It is not unusual for municipalities to inadvertently place groundwater quality and yield at risk by permitting low-density zoning (one and two-acre lots) that can only be served by on-lot water and septic systems. Dispersed development patterns in combination with a lack of public oversight for septic system maintenance has frequently resulted in localized areas of septic system failure and contaminated on-lot wells. This situation, in turn, creates a need to extend public sewer and water lines for great distances and at significant public cost to remediate these situations. Even areas planned for growth are not always zoned or built at densities that are conducive to the development of new community water and sewer systems, nor are they always located near existing community water and sewer systems. Several municipalities within Lycoming County in

the path of growth have just such low-density zoning. This places them at the greatest risk for potential contamination or overdrawing of groundwater because of unpredictable future land uses. Municipalities can protect their groundwater quality and yields by taking the following actions related to on-lot water wells:

- Adopt well siting, construction, water quality testing, and abandonment standards as part of the subdivision and permitting process to protect groundwater quality; such requirements should involve siting wells at safe distances from potential contaminant threats, grouting, and the placement of a sanitary seal on all at- or below-grade well openings.

- Adopt on-lot septic system ordinances to assure adequate siting, maintenance, pumping, and replacement of systems so as to minimize potential adverse impacts on groundwater. On-lot septic systems should be pumped every three years. Alternatively, a municipality might create a local sewer district in which it charges each household a small annual fee, and in return takes responsibility for the maintenance and replacement of septic systems.

- Adopt aquifer testing requirements for proposed new subdivisions and land developments to assure adequate water supply and to assure no adverse impacts on adjacent existing development.

- Require that any new development within one-half mile of an existing municipal community water system be connected to the municipal water system.

- Discourage the proliferation of on-lot water systems by revising comprehensive plans and zoning ordinances to:

    1) direct future development into planned growth areas with densities conducive to the provision of community water and sewer systems (three to four units per acre),
    2) rezone large areas of productive agricultural and forest lands using a fixed area or sliding scale district that results in a maximum density of one unit per 25 acres,
    3) rezone suburbanizing areas at the edge of municipal water systems for cluster development that can be served by the municipal system

Groundwater quality yield in the County can only be protected through a coordinated effort among residents, municipalities and the County. Community planning programs and the application of appropriate zoning standards are essential. Residents must also be educated as to the necessity of regularly pumping septic systems and proper septic system usage. At a minimum, municipalities should monitor the incidence of septage system pumping. If indicated, municipalities should require such pumping through the adoption of on-lot disposal system ordinances.

The County could assist in documenting changing groundwater availability across the County by requesting that the USGS utilize multiple monitoring wells at selected locations. This would enable the County to provide better notification to public water suppliers and others of potential groundwater shortfalls.

3. REGIONAL STRATEGIES

Within some of the County's regions there are significant shortfalls in individual system safe yield and storage capacity that could be reduced through interconnects with other nearby existing systems with surpluses. Within all of the County's regions, there are systems with significant shortcomings in operational or financial management which could be addressed through various regional, cooperative and other joint approaches. With more stringent regulatory requirements anticipated for the future, the cost of providing adequate potable drinking water to County residents will increase. Larger community or regional water providers, through economies of scale and larger customer bases, are more capable than small systems of implementing required solutions at affordable customer costs. Therefore, in general, strong public water systems, particularly those providing service to the City and boroughs, are encouraged to interconnect with smaller systems, particularly mobile home parks, wherever physically possible and economically feasible. Where interconnection is not practical, larger nearby systems are encouraged to offer satellite management and joint acquisition services to smaller systems. Where cost is a barrier in pursuing such regional solutions, it is recommended that the Lycoming County Sewer and Water Authority (LCWSA) assist in offsetting interconnection costs and taking an active role in encouraging joint solutions to problems. In more remote areas of the County, or in areas where strong public water systems do not come forward, the LCSWA is encouraged to provide financial management assistance either directly, through mergers or the setting up of cooperatives. Finally, recommendations are made for regions of the County, which, because of few or weak systems, will likely need new community water systems to accommodate planned future growth and development.

For purposes of making regional recommendations, Lycoming County's community water systems were divided into six regions as follows:

Region 1:	***West*** – Jersey Shore, Waterville, Limestone & Collomsville
Region 2:	***North*** – Roaring Branch, Ralston, Wilawan, Bittner's & Trout Run (new)
Region 3:	***Central*** – Williamsport, American, Cogan Valley, ABC, Fairlawn, Pine Crest, Mountain Laurel, Hidden Valley, Carpenters & Harvest Moon
Region 4:	***Eastcentral*** – Montoursville, Loyalsock, Tiadaghton, Village, Twin Hills, Timberend, Vali-View, Lycoming Mall, PP&L and Farragut (new)
Region 5:	***East*** – Hughesville, Muncy, Bartos, Orchard, Oak-Lynn, Heatherbrooke, Pleasant Pines, Meadowbrook, Foxcroft, Picture Rocks (new) & Lairdsville (new)

Region 6: ***Southeast*** – Montgomery, Allenwood, Muncy State & Elimsport (new)

Each of these regions has one or more municipal systems or authorities. These regions, in turn, were divided into sub-regions to enable more specific recommendations to be made. These sub-regions are as follows:

Region 1: ***Jersey Shore sub-region***
Limestone sub-region

Region 2: ***McIntyre sub-region***
Trout Run sub-region

Region 3: ***Williamsport sub-region***

Region 4: ***Montoursville Area sub-region***
Halls Station Area sub-region

Region 5: ***Hughesville sub-region***
Muncy sub-region

Region 6: ***Montgomery sub-region***

In the following narrative, those characteristics of systems lending themselves to regional management are set forth. Significant projected year 2020 system capacity surpluses and shortfalls are noted (10,000+gpd), as are existing and potential interconnections (within one mile). Recommendations for the shared provision of adequate safe yield and storage are made, together with the interconnections that would make this possible. The recommendations continue by proposing joint approaches to system management. Finally, recommendations for new community water systems are also provided.

REGION 1: WEST

This region encompasses the Jersey Shore and Limestone sub-regions and includes Jersey Shore and Salladasburg Boroughs and parts of Limestone, Nippenose, Porter, Piatt, Anthony, Mifflin and Cummings townships.

Jersey Shore Sub-Region					
System	Management	System Capacity		Interconnections	
		Surpluses	Shortfalls	Existing	Potential
1. Jersey Shore Joint Water Authority	strong	• safe yield • storage		no	no
2. Waterville Water Association	weak			no	no

The Jersey Shore Joint Water Authority is a very strong system with significant surplus safe yield, storage and treatment plant capacity projected for 2020. The system should not have serious problems serving additional projected growth; however, it may need to add elevated storage if higher-elevation areas are developed. Significant areas of suburban zoning in Piatt Township could create additional demand beyond year 2020 projections, which the system could serve. It is recommended that no new community or noncommunity water systems be created within the current or projected future service area of the Jersey Shore system because of its significant remaining capacity and its past willingness to extend service. As the system grows outward, it should also be encouraged to connect with and serve existing noncommunity water systems en route. The Waterville Water Association has adequate safe yield and distribution storage to meet projected 2020 demand, but inadequate fire storage. While it is too far from the Jersey Shore system to interconnect, the system might be able to lower its operating costs and improve management by enacting formal cooperation and joint contractual assistance with the Jersey Shore system. Both systems need to adopt wellhead protection programs and the New Jersey system a watershed protection program.

Limestone Sub-Region					
System	Management	System Capacity		Interconnections	
		Surpluses	Shortfalls	Existing	Potential
1. Limestone Twp. Authority Water System	weak			No	yes
2. Collomsville Mutual Waterworks	weak	• storage	• safe yield	No	yes

This sub-region includes two systems in very close proximity to each other with the potential to interconnect or even consolidate and many reasons to do so, including improved opportunities for management. While both systems have plenty of distribution storage, they both lack fire storage and Collomsville lacks safe yield and has been drought-affected. Significant cost savings could be achieved if these systems were to jointly pursue an additional water source and storage facility. The Limestone system has just completed construction of a 194,000 gpd filter plant with enough capacity to meet 2020 demand for both systems. An interconnection or consolidated single system would have the added probable benefit of lowering operating costs and improving management. The Limestone system is currently pursuing an interconnection with nearby Mountainview Estates MHP, which is experiencing water quality problems. The Collomsville system is reported to lack any certified operator. In view of the extensive suburban zoning in the Township and the

likely continuing demand for service in the area, a joint approach to providing for future water is recommended, together with a joint wellhead and watershed protection program.

REGION 2: NORTH

This region encompasses the McIntyre and Trout Run sub-regions and includes portions of McIntyre, Lewis and McNett townships.

McIntyre Sub-Region

System	Management	System Capacity		Interconnections	
		Surpluses	Shortfalls	Existing	Potential
1. Roaring Branch Water Association	fair	• safe yield • storage		No	no
2. Ralston Area Joint Authority	fair	• safe yield	• storage	No	no

The Roaring Branch and Ralston Area systems in the far north of the County are close enough to benefit from some type of formal cooperation or joint contractual assistance, thereby lowering operating costs and improving management. The Ralston system's raw storage facility could fairly easily be converted to finished storage. Ralston's wells were recently found to be surface water influenced, meaning that the system will either have to provide for full filtration or find other water sources. Wellhead protection programs are needed for both systems. Ralston's rates are currently too low to cover operating costs, and need to be increased to cover both full operating costs as well as any new construction costs. Neither the Ralston nor the Roaring Branch areas are projected for significant growth or development.

Trout Run Sub-Region

System	Management	System Capacity		Interconnections	
		Surpluses	Shortfalls	Existing	Potential
1. Wilawan MHP	Weak	• safe yield		no	no
2. Bittners MHP	Weak	• safe yield		no	no
3. Trout Run (new)				no	yes

The Wilawan and Bittners systems have excess safe yield but distribution storage shortfalls to the year 2020. Both systems need to construct additional storage capacity as the systems are not close enough to each other to share storage. Both systems could benefit from enacting formal cooperation or shared contractual assistance, however, as a way to lower operating costs and improve management; records for this sub-region indicate that there are no certified operators. Finally, wellhead protection programs should be adopted for both systems. Remedial water service is needed for the Trout Run area due to septic system failure and groundwater problems. An ideal solution would be for the Bittners MHP to serve this area as well as the small amount of projected future growth in this area. If the Bittners

system cannot do this, a new community water system should be considered. The LCWSA could be utilized to develop any new system or combine the two systems.

REGION 3: CENTRAL

This region includes the Williamsport sub-region and involves the City of Williamsport and South Williamsport and Duboistown boroughs as well as parts of Armstrong, Loyalsock, Old Lycoming and Woodward townships.

Williamsport Sub-Region

System	Management	System Capacity		Interconnections	
		Surpluses	Shortfalls	Existing	Potential
1. Williamsport Municipal Water Authority	Strong	• safe yield • storage		no	yes
2. Mountain Laurel MHP	Weak	• safe yield	• unknown storage	no	yes
3. Harvest Moon Trailer Court	Weak			no	no
4. Carpenters MHP	Weak	• safe yield		no	no
5. Hidden Valley MHP	Weak			no	no
6. American Tempo MHP	Weak			no	no
7. Cogan Valley MHP	Weak	• safe yield	• storage	no	no
8. ABC #2 MHP	Weak	• safe yield		no	yes
9. Fairlawn MHP	Weak	• safe yield		no	yes
10. Pine Crest Village MHP	Fair		• unknown safe yield	no	no

The Williamsport Municipal Water Authority is a very strong system in a sub-region with a number of other community water systems, all of which are mobile home parks. Because of its very significant excess safe yield, treatment and storage capacity – the greatest in the County – and proximity of so many other systems, the Williamsport system has tremendous potential to assist other systems. As this system expands outward, it is recommended that it interconnect with both community and noncommunity water systems in the path of growth and that no new community or noncommunity systems be created within its existing or projected feasible service area. Future service to higher-elevation development may require this system to provide for additional elevated storage at some point. Especially feasible potential interconnections appear to be with the Mountain Laurel, ABC and Fairlawn systems, all of which lack sufficient storage, as well as Lycoming Valley Junior High and Hepburn Lycoming Elementary School. Other possible eventual interconnects include Cogan Valley and American Tempo, which also lack sufficient storage, and Pine Crest Village, which has been drought-affected. Any of these systems that do not interconnect would benefit from formal cooperation and shared contractual assistance to lower operating costs and improve management; the Fairlawn system is reported to lack any certified system operators. Significant areas of suburban zoning north of the Williamsport system will continue to contribute to demand for public water from the Williamsport system in the future. These townships are recommended to reevaluate these areas and rezone significant areas for low-density agricultural and forest preservation zoning, both to reduce development

pressure and to protect these resources. Carpenters, Harvest Moon, and Hidden Valley are systems that are in fairly good shape but are reported to lack any certified operators. Because sewer lines are planned to be extended to the Carpenters and Harvest Moon systems as well as adjacent Woodward Township Elementary School, it would make sense to extend public water from the Williamsport system to these areas at the same time. All systems within the sub-region need to adopt wellhead protection programs, and the Williamsport system should adopt a watershed protection program.

REGION 4: EASTCENTRAL

This region includes the Montoursville Area and Halls Station sub-regions covering Montoursville Borough and parts of Fairfield, Upper Fairfield and Muncy townships.

Montoursville Area Sub-Region

System	Management	System Capacity		Interconnections	
		Surpluses	Shortfalls	Existing	Potential
1. Montoursville Boro Waterworks	Strong	• safe yield • storage		no	no
2. Loyalsock MHP	Weak			no	yes
2. Tiadaghton MHP	weak	• safe yield		no	yes
3. Farragut (new)				no	?

The Mountoursville Boro Waterworks is a strong system that has some excess safe yield and distribution storage, though insufficient fire storage to 2020. The system does not provide filtration and is currently not required to do so. The Loyalsock and Tiadaghton systems, adjacent to each other, both lack sufficient distribution storage for current demand and would benefit by an interconnection and shared provision of additional storage. In addition, shared management or contractual assistance could lower operating costs and improve management; Loyalsock is reported as having no certified system operators. These two systems need to adopt wellhead protection programs. The Farragut area has been experiencing septic system failure and groundwater problems and should be served with public water. If the Williamsport Authority, whose projected future service area extends nearly to this area, could provide service, this would be the ideal solution. If not, a new community water system at this location would be warranted, especially if local zoning were to encourage higher density development adjacent to the new system and low-density, resource zoning in other parts of Upper Fairfield and adjacent townships.

Halls Station Area Sub-Region					
		System Capacity		Interconnections	
System	Management	Surpluses	Shortfalls	Existing	Potential
1. PP&L System		• safe yield • storage		no	yes
2. Village Water Inc.	weak		• storage	no	yes
3. Twin Hills MHP	weak		• storage	no	yes
4. Vali-View MHP	weak	• safe yield	• storage	no	yes
5. Timberend Estates MHP	weak	• safe yield	• unknown storage	no	yes
6. Lycoming Mall Water System		• storage	• safe yield	no	yes

The Halls Station Area Subarea is an unusual one in that it has two noncommunity water systems with sufficient strength to provide assistance to several intervening systems – three mobile home parks and one system planned for significant growth and development. All of these systems could potentially be interconnected; the Timberend system might or might not be part of an interconnection strategy. The Lycoming Mall Water System has until now provided only for the commercial demand within the mall, but it is possible to use the existing Mall system to meet not only the projected expanded needs of the growing mall and its outparcels, but the remedial water needs of existing residents in the Halls Station area as well as new principally commercial needs in two townships. Currently, new water sources are being explored for possible incorporation into the Mall water system; a firm has been selected to commence hydro and design work. All of the intervening systems lack either sufficient storage or safe yield or both to the year 2020 and would, therefore, benefit greatly through the interconnection of these systems. The Timberend and Vali-View systems are reported to lack any certified operators. A new elevated storage standpipe would be needed near the PP&L facility to meet higher-elevation service needs, but, over the long run, sufficient safe yield should be available in the PP&L and Village systems to meet anticipated 2020 corridor growth as well as the needs of existing corridor systems. It is recommended that the Lycoming County Sewer and Water Authority play a role in the management of any new service area. All systems in this sub-region should adopt wellhead protection programs. (See more detailed analysis in Appendix R)

REGION 5: EAST

This region includes the Hughesville and Muncy sub-regions encompassing Hughesville, Muncy and Picture Rocks boroughs, and parts of Wolf Township.

Hughesville Sub-Region					
		System Capacity		Interconnections	
System	Management	Surpluses	Shortfalls	Existing	Potential
1. Hughesville Borough Water System	fair	• safe yield	• storage	no	yes
2. Picture Rocks (new)				no	yes
3. Bartos Trailer Park	weak	• safe yield		no	yes
4. Orchard MHP	weak	• safe yield	• storage	no	yes
5. Oak Lynn Manor MHP	weak	• safe yield	• storage	no	yes
6. Lairdsville (new)				no	?

The Hughesville Borough Water System has significant excess safe yield to 2020 but inadequate distribution and fire storage. The system has expressed an interest in extending water service to the nearby Barto's, Orchard and Oak Lynn Manor mobile home parks just south of the Borough. All three of these systems lack current and future distribution storage and would be well served through a joint approach with the Borough, which needs to provide additional storage for itself anyway. This could involve interconnections or transfer of ownership. In addition, the Borough of Picture Rocks, just north of Hughesville's water sources has been experiencing failed septic systems and groundwater problems and has sufficient density and dwelling numbers to warrant public water service. The Hughesville system has sufficient excess safe yield to serve Picture Rocks, which would incur significant cost savings over the provision of a new community water system. The Hughesville system does not provide filtration and is not required to do so, but has experienced problems with copper in the water in the past. Any systems which are not integrated into the Hughesville system would benefit from shared contractual assistance and formal cooperation to lower operating costs and improve system management; the Barto's, Oak-Lynn, and Orchard systems are shown to lack any certified operators. All systems within the sub-region need to adopt wellhead protection programs. The Lairdsville area has experienced septic system failure and groundwater problems. As the area is planned for a fair amount of growth and is too distant from other systems to interconnect, it should be evaluated for whether it would be more effective to repair and replace malfunctioning septics and wells or develop its own new community water system, which could also serve the C.G. Renn Elementary School. The LCWSA could be utilized to develop this new system.

Muncy Sub-Region					
		System Capacity		Interconnections	
System	Management	Surpluses	Shortfalls	Existing	Potential
1. Muncy Boro Water System	weak	• safe yield • storage		no	yes
2. Heatherbrooke Estates MHP	weak	• safe yield		no	yes
3. Pleasant Pines MHP	weak			no	yes
4. Meadowbrook MHP	weak	• safe yield		no	yes
5. Foxcroft Manor MHP	weak	• safe yield		np	no

The Muncy Borough Water System has significant excess safe yield as well as distribution and fire storage capacity to 2020. Little data was made available to evaluate the financial viability of this system, which otherwise might have been rated higher for management. The system does not provide filtration and is not yet required to do so. The Meadowbrook system is doing well and will not likely need to be interconnected. The Heatherbrooke and Pleasant Pines mobile home parks could actually be interconnected either with the Muncy system or the Hughesville system, though only the Pleasant Pines system has a shortfall, and that is for current and future storage. Foxcroft has a current storage shortfall but is probably too far from both the Muncy and Hughesville systems to interconnect, so will need to meet its needs on its own. All of these systems could benefit from shared contractual assistance or formal cooperation to lower operating costs and improve management; records show no certified operators for any of these system. All systems within the sub-region need to adopt wellhead protection programs.

REGION 6: SOUTHEAST

This region encompasses the Montgomery sub-region and includes Montgomery Borough and parts of Clinton, Brady and Washington townships.

Montgomery Sub-Region					
		System Capacity		Interconnections	
System	Management	Surpluses	Shortfalls	Existing	Potential
1. Montgomery Borough Water System	fair	• safe yield • storage		no	yes
2. Allenwood Federal Prison Camp	weak	• storage	• safe yield	no	no
3. Muncy State Correctional Institute	weak	• safe yield • storage		no	yes
4. Elimsport (new)				no	?

The Montgomery Borough Water System has significant excess safe yield as well as distribution and fire storage capacity to 2020. The Borough wants to add an elevated tank to serve the growth area to the northeast. The system does not filter and is not yet required to do so, though there has been a problem in the past with nitrates and testing for surface water influence is ongoing. If surface water influence is verified, the system will either need to construct a treatment facility or locate new source wells. The Montgomery and Muncy State Correctional systems could be interconnected and there may be reason to do so if the Montgomery system needs to provide filtration, as the Muncy State Correctional system has a filter plant. While this plant will need to be expanded to meet projected year 2020 demand for the system, it could be done so jointly with Montgomery Borough. Such a coordinated approach could yield significant construction and operation cost savings for both systems and is recommended. The Allenwood system is somewhat far from the Montgomery system to interconnect and the system's large storage surplus should normally compensate for its safe yield shortfall. The system does need to provide for better disinfection. Records indicate that there are no certified operators for this system. All of the systems in the sub-region could benefit from shared contractual assistance or formal cooperation to lower operating costs and improve management. All should also develop wellhead protection programs. The Elimsport area has been experiencing failing septic systems and groundwater problems. Because of the distance of this area from other systems, it should be evaluated for whether it would be more effective to repair and replace malfunctioning septics and wells or develop a new community water system which could also serve the Elimsport Elementary School. The LCWSA could be utilized to develop this new system.

There is also possible water demand in this region for the Lycoming County Industrial Park located along Route 15. Since this area is reasonably close to existing water supply systems in neighboring Clinton County, extension of water service lines to the Industrial Park may be feasible. However, a thorough evaluation of this water supply option will need to be developed. For a preliminary report of findings related to potential water service to the Industrial Park from Clinton County water supply systems, refer to Appendix T of this document.

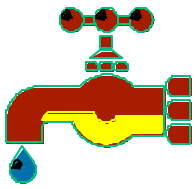
4. CONCLUSIONS

Municipal support for the recommendations of this Plan is essential. Community water systems capable of assisting others may not reach out on their own to help troubled systems without active local and County support and encouragement. Weaker community water systems and troubled on-lot developments may not ask for assistance and need to be supported in requesting help as well. The fewer new wells that are drilled into the County's aquifers, the fewer the potential sources of contamination. It makes sense to utilize existing sources to the fullest before drilling new wells.

Municipal comprehensive planning and zoning can support the recommendations of this plan or undermine them. If the County's strong community water systems are to be encouraged to make needed improvements and extend water service to remedial water users, they must be permitted to extend their systems to serve new development as well. Increases in rate

bases must be expected to help fund needed system improvements. It is critical that local municipalities plan and zone land for development at densities that can utilize community water adjacent to their stronger community water systems. New growth should be directed primarily into growth areas as identified in the County's Comprehensive Plan.

A variety of grants, loans and technical assistance are available for improvements to community water systems. The DEP sponsors the Small Water Systems Outreach Program that provides education and assistance for small systems experiencing difficulties in system operation, maintenance, or management. The DEP also has a Small Water Systems Consolidation Construction Grant Program that provides grants to facilitate the merger of community water systems. The Small Water Systems Regionalization Grant Program, which provides grants for assessing the feasibility of the formation of regionalized water systems, is additionally operated by DEP. Loans for system improvements are available through PENNVEST. More recently, the DEP has established the Source Water Protection Program, which takes the place of and expands on the earlier Wellhead Protection Program; these programs and others are described in Chapter VI, the final pages of which provide contact numbers for sources of information and help.



V. WATER SOURCE ALTERNATIVES

A. INTRODUCTION

Based on the evaluation of remedial future water needs in the County, some communities will require additional water resources to meet the current and projected demand. Five communities that are not currently serviced by public or private water suppliers, have been experiencing groundwater quality problems, and are projected for modest growth. They include Trout Run, Lairdsville, Elimsport, Farragut and Picture Rocks. There are also five existing water systems that will have a projected 2020 water supply shortfall. These include Allenwood Prison Camp, Collomsville Mutual Waterworks, Hidden Valley MHP, Pinecrest MHP and Village Water Inc. Other non-serviced communities with existing or potential groundwater quality problems may require attention but have not yet been identified.

In this chapter, the communities within the non-serviced areas are evaluated for alternatives to meet the projected demands. Recommended source alternatives and water development costs are estimated for each area and alternative. For the existing water systems projected to have water shortfalls, the report also provides source alternatives and recommendations.

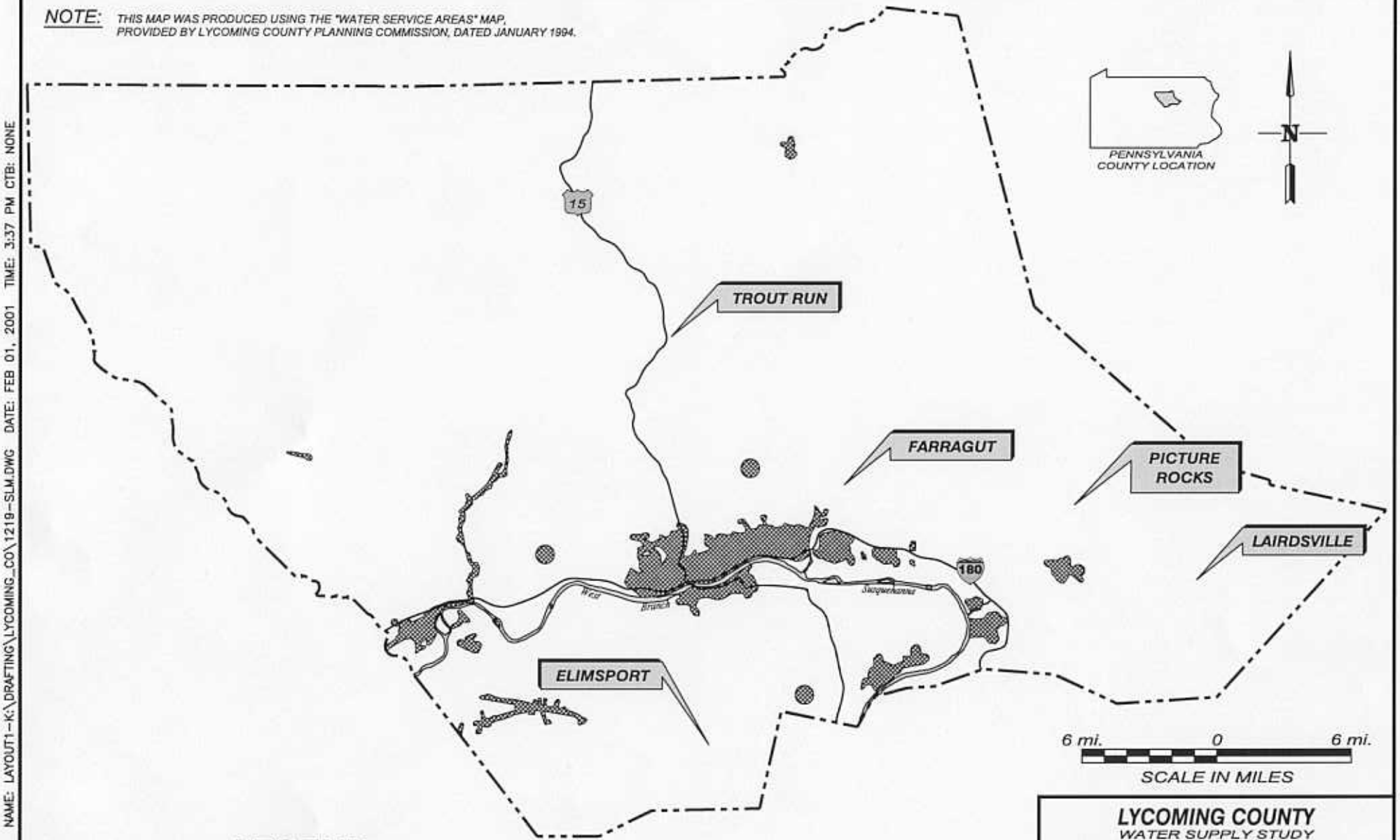
B. POTENTIAL SERVICE AREAS

The locations of the five identified potential new service areas are illustrated on Figure 5-1. These areas are identified for possible public water service primarily to resolve groundwater quality problems, but also to allow additional growth.

1. WATER DEMAND PROJECTIONS

An analysis was performed to estimate the quantity of water that will be required to provide each non-serviced area with adequate water supply in 2020. Table 22 summarizes the projected populations and resulting peak daily demands for each of these areas. The 2020 peak daily water use is the sum of the residential, non-residential (e.g. commercial), and elementary school demands based on projected populations. Importantly, planned transportation improvements position Picture Rocks to grow more rapidly than these projections indicate.

NOTE: THIS MAP WAS PRODUCED USING THE "WATER SERVICE AREAS" MAP, PROVIDED BY LYCOMING COUNTY PLANNING COMMISSION, DATED JANUARY 1994.



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LEGEND

WATER SERVICE AREA

LYCOMING COUNTY
WATER SUPPLY STUDY

Potential Water Service Areas

drawn WAA	checked ESA	approved MDM	figure no. 5-1
date (02/05/01)	date (02/01/01)	date (02/07/01)	
job no. 01-1408-00-1219-000		file no. 1219-SLM-A	

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Table 22
Projected Water Demand Analysis
County Water Supply Plan
Lycoming County Planning Commission

Potential Service Area	Estimated Current Population	Estimated 2020 Population	Projected 2020 Peak Daily Water Use			
			Residential (gallons)	Non-Residential (gallons)	Elementary School (gallons)	Total (gallons)
Trout Run	250	275	29,425	1,760	--	29,626
Lairdsville	100	110	11,770	704	6,360	17,892
Elimsport	100	110	11,770	704	2,540	14,263
Farragut	250	275	29,425	1,760	--	29,626
Picture Rocks	686	741	79,287	0	3,960	81,175

Notes: The total projected 2020 peak daily water use volumes take into account a 5% conservation factor.
The peak residential water use rate is 107 gallons per person per day.
Elementary school demands are based on a 10% increase from the current populations of
Lairdsville = 289, Elimsport = 115, and Picture Rocks = 180.
The water use rate for schools with food service is 20 gallons per person per day.

2. SOURCE ALTERNATIVES

There are several alternatives for providing water sources capable of meeting the anticipated demands in each potential service area. These alternatives are:

- Development of groundwater resources
- Development of surface water resources
- Interconnection with an existing water system.

Wastewater reuse, an evolving and viable technology, was not considered here due to the lack of central wastewater collection systems and uncertain public acceptance.

There are advantages and disadvantages to each alternative to be considered in selecting a source. The preferred alternative is to interconnect to an existing water system. This offers the major advantages of an established supply, water treatment, and the organization and system operators needed to run a water system. In some cases, an existing water system may be located within a reasonable distance of the community requiring a water source and could provide a ready supply if a surplus is available. However, this alternative may not be practical due to pipeline distance or natural obstructions such as rivers or mountains.

In general, groundwater is the least costly source to develop (comparisons in Section 3). It is less susceptible to contamination than surface water and generally requires only disinfection (filtration may be needed for wells proven to be under the direct influence of surface water) to be used as drinking water, although users may add softening in some limestone areas. In addition, groundwater can usually be developed and permitted relatively quickly because there are fewer applicable regulations. Wells may also be installed in locations relatively convenient to the point of use, depending on the local aquifer properties. However, in some regions, local aquifers may not yield the quantity or quality of water required. Although iron and manganese are generally found at acceptable concentrations in these aquifers, removal/treatment technologies are readily available if objectionable concentrations are encountered, but can add to the cost of groundwater development.

In some regions, surface water may be the only feasible supply alternative. Generally, surface water supplies can provide relatively large quantities, particularly where reservoirs are used. However, reservoirs are difficult and expensive to construct, and (alternative) simple stream intakes must be taken off-line during high runoff periods due to excessive turbidity. In addition, surface water requires relatively expensive filtration and disinfection and the full-time maintenance often associated with filtration units.

Each of the potential service areas was evaluated with respect to these alternatives. Interconnection was considered viable, particularly if the nearest existing water system showed excess capacity available. Groundwater was considered viable for an area if the individual well yields in the underlying aquifer were comparable to the projected demands. Surface water was considered viable where local stream flows were estimated

to greatly exceed water demands, based on a nominal one-square-mile contributing watershed for each 10,000 GPD. Simple stream intakes could thus be employed with adequate storage (assumed three days) and without the use of reservoirs. The water source alternatives available to each potential service area are summarized in Table 23.

Figures 5-2 through 5-6 illustrate the location of each growth area with respect to geologic formations and streams. Potential locations for groundwater exploration are indicated using a potential well symbol. Primary and back-up wells are shown for each area. Also, potential finished water storage tanks and pumping stations/treatment buildings are indicated. The potential wells and storage tank locations were selected with respect to service area, geology, topography, roads, railroad tracks, and streams. The water service area boundary indicated on each map was estimated for the sole purpose of assessing the alternatives. A thorough hydrogeologic and engineering study must be performed prior to any water resource development project.

Based on an analysis of well performance for the aquifers underlying the potential service areas (PADER, 1981), there is access to an adequate groundwater sources. The Catskill, Trimmers Rocks, and Lock Haven Formations, which underlay Trout Run, Farragut, Picture Rock, and Lairdsville, consist primarily of siltstone with lesser amounts of shale and sandstone. The median yield of non-domestic wells completed in these formations is 67 gallons per minute (gpm, or 96,480 gpd).

The Tonoloway Formation, located under Elimsport, is composed primarily of limestone. The median yield for non-domestic wells in this formation is 110 gpm (158,400 gpd). Therefore, one 'typical' non-domestic well constructed in these formations will yield enough water to meet the projected 2020 peak daily demand of each individual growth area. The groundwater quality within these formations is typically favorable, with some local variations.

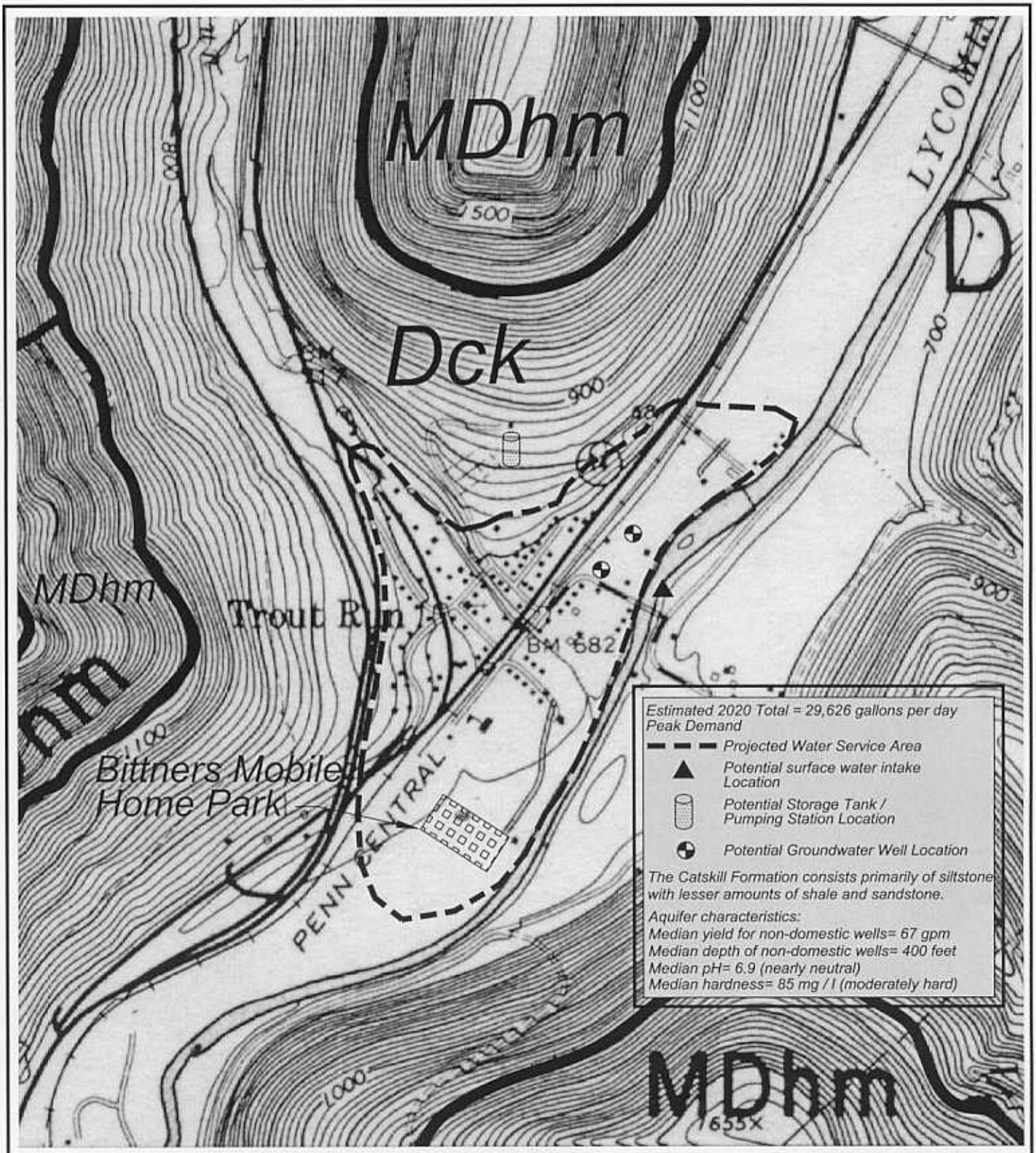
The local surface water sources (streams) near each growth area appear to be capable of meeting the projected 2020 demands. However, the low flow and water quality characteristics of each source are unknown without field investigation.

None of the growth areas are adjacent to an existing community water system. Trout Run, Farragut and Picture Rocks are located within 15,000 feet of existing community water service areas. Lairdsville and Elimsport are substantially farther from existing community service areas, but do have school supplies that may offer upgrade opportunities.

Table 23
Summary of Available Source Alternatives
County Water Supply Plan
Lycoming County Planning Commission

Potential Service Area	Groundwater (1)			Surface Water (4)			Interconnection (2,3)		
	Aquifer Name	Relative* Yield Potential	Water Quality Potential	Creek Name	Dist. To Creek	Adequate Yield Available	Nearest Water System	Dist. To System	Surplus Available
Trout Run	Catskill	Good	Good	Lycoming	500'	Yes	Bittners MHP	500'	Yes
Lairdsville	Trimmers Rock	Good	Good	Little Muncy	500'	Yes	Hughesville	35,000'	Yes
Elimsport	Tonoloway	Good	Good	White Deer Hole (5)	6,000'	Yes	Collomsville	40,000'	No
Farragut	Lock Haven	Good	Good	Loyalsock	2,000'	Yes	Montoursville	13,000'	Yes
Picture Rocks	Trimmers Rock	Good	Good	Muncy	100'	Yes	Hughesville	12,000'	Yes

Note: *Relative yield potential with respect to projected demand.
(1) Groundwater Resources of the Williamsport Region, Lycoming County, PA, PADER, 1981
(2) Water Service Areas Map, Lycoming County Planning Commission, 1994
(3) Community and Non-Transient Water Systems , Lycoming County Economic Development and Planning Services, 2000
(4) Simple stream intakes without reservoirs
(5) Designated high quality stream



NOTE: GEOLOGY AND MAP IS BASED UPON THE TROUT RUN, GEOLOGIC 7.5 MIN. QUADRANGLE, TAKEN FROM THE ATLAS OF PRELIMINARY GEOLOGIC QUADRANGLE MAPS OF PENNSYLVANIA, 1981.

LEGEND

Geologic Contact

MDhm- Huntley Mountain Formation

Dck- Catskill Formation

1000' 0 1000'

SCALE IN FEET

LYCOMING COUNTY

WATER SUPPLY STUDY

TROUT RUN GEOLOGIC MAP

drawn	checked	approved	figure no.
WAA	ESA	MDH	5-2
date 02/05/01	date 02/06/01	date 02/07/01	
job no. 01-1408-00-1219-006		file no. 1219-006-A	

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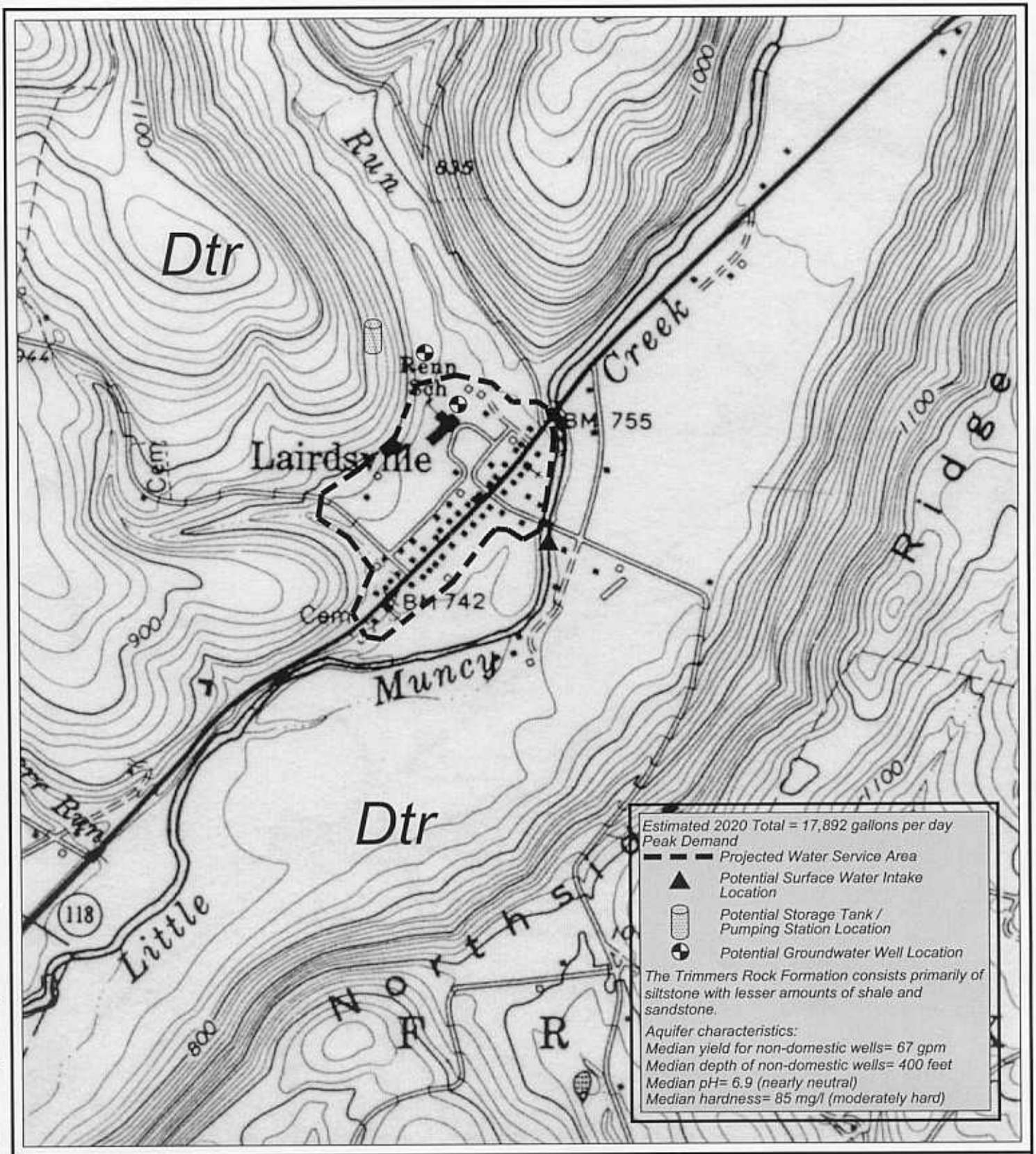
Note: The exact location of groundwater wells, surface water intake, storage tank, and pumping stations must be determined by thorough hydrogeologic and engineering studdies.

NAME: LAYOUT1-K:\DRAFTING\LYCOMING_CO\1219-006.DWG DATE: JAN 24, 2001 TIME: 11:17 AM CTB: NONE



NOTE: GEOLOGY AND MAP IS BASED UPON THE LAIRDSVILLE, HUGHESVILLE, PICTURE ROCKS, AND SONESTOWN, GEOLOGIC 7.5 MIN. QUADRANGLES, TAKEN FROM THE ATLAS OF PRELIMINARY GEOLOGIC QUADRANGLE MAPS OF PENNSYLVANIA, 1981.

LEGEND

Geologic Contact

Dtr — Trimmers Rock Formation (Lock Haven & Brallier Fms.)

PENNSYLVANIA QUADRANGLE LOCATIONS

N

1000' 0 1000'

SCALE IN FEET

LYCOMING COUNTY

WATER SUPPLY STUDY

LAIRDSVILLE GEOLOGIC MAP

drawn	checked	approved	figure no.
WAA	KSA	MDH	5-3
date 02/05/01	date 02/06/01	date 02/07/01	
job no. 01-1408-00-1219-006	file no. 1219-003-A		

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Note: The exact location of groundwater wells, surface water intake, storage tank, and pumping stations must be determined by thorough hydrogeologic and engineering studies.

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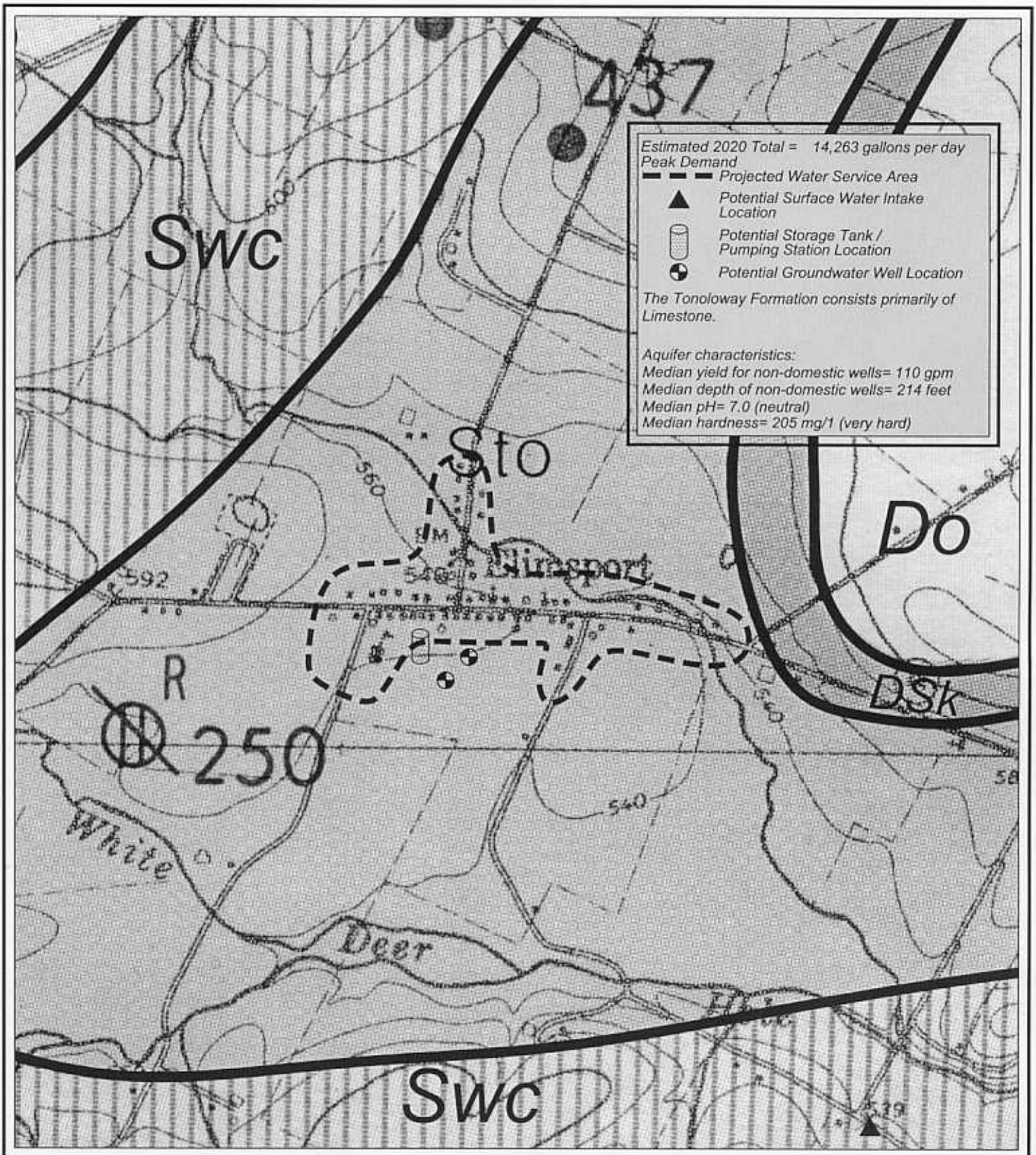

NOTE: GEOLOGY AND MAP IS BASED UPON THE GEOLOGIC AND HYDROLOGIC MAP OF THE WILLIAMSPORT REGION, LYCOMING COUNTY, PENNSYLVANIA, 1981.

LEGEND

———	Geologic Contact
Do-	Old Port Formation
DSk-	Keyser Formation
Sto-	Tonoloway Formation
Swc-	Wills Creek Formation

PENNSYLVANIA QUADRANGLE LOCATION

N

1000' 0 1000'

SCALE IN FEET

LYCOMING COUNTY
WATER SUPPLY STUDY

ELIMSPORT GEOLOGIC MAP

drawn WAA	checked ESA	approved MDH	figure no. 5-4
date 02/05/01	date 02/06/01	date 02/07/01	
job no. 01-1408-00-1219-006		file no. 1219-004-A	

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Note: The exact location of groundwater wells, surface water intake, storage tank, and pumping stations must be determined by thorough hydrogeologic and engineering studies.

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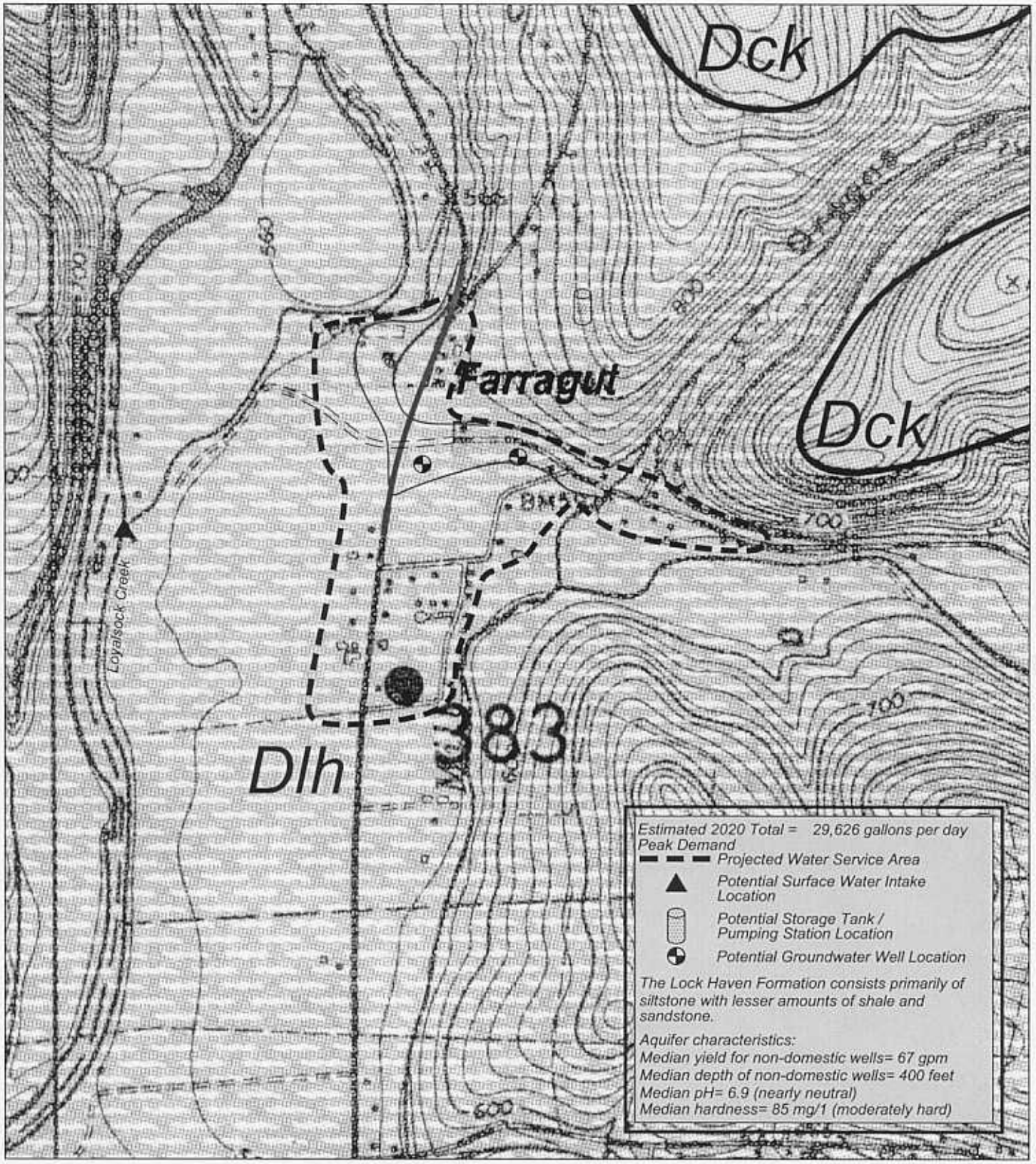
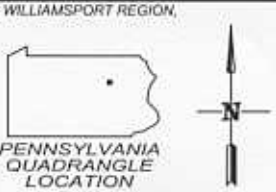


NOTE: GEOLOGY AND MAP IS BASED UPON THE GEOLOGIC AND HYDROLOGIC MAP OF THE WILLIAMSPORT REGION, LYCOMING COUNTY, PENNSYLVANIA, 1981.

LEGEND

———	Geologic Contact
Dck	Catskill Formation
Dlh	Lock Haven Formation



1000' 0 1000'

SCALE IN FEET

LYCOMING COUNTY
WATER SUPPLY STUDY

FARRAGUT GEOLOGIC MAP

drawn WAA	checked KSA	approved MDH	figure no. 5-5
date 02/05/01	date 02/06/01	date 02/07/01	
job no. 01-1408-00-1219-006		file no. 1219-005-A	

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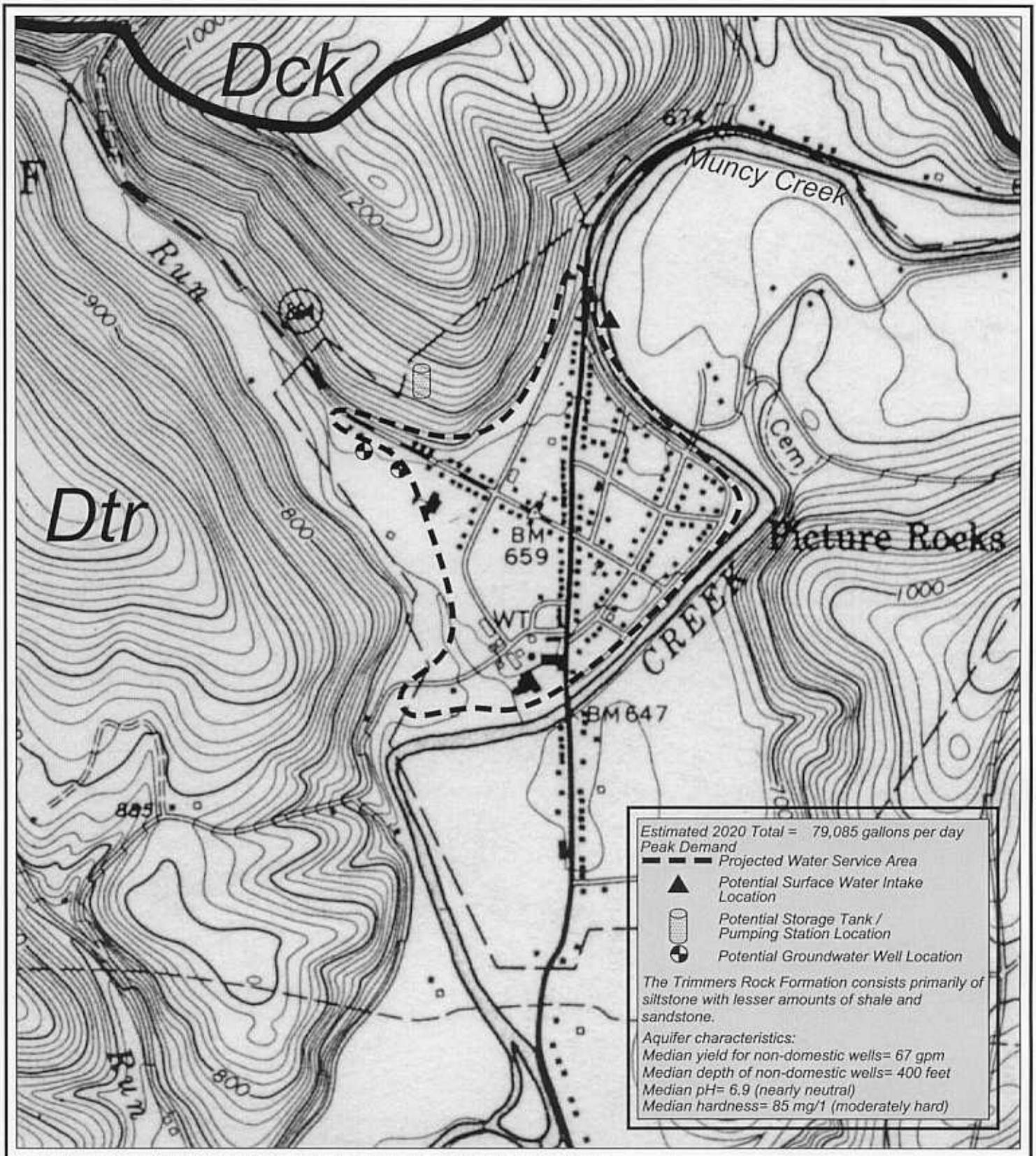
Note: The exact location of groundwater wells, surface water intake, storage tank, and pumping stations must be determined by thorough hydrogeologic and engineering studies.



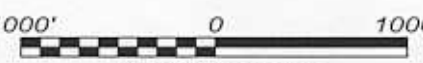
NOTE: GEOLOGY AND MAP IS BASED UPON THE PICTURE ROCKS, GEOLOGIC 7.5 MIN. QUADRANGLE, TAKEN FROM THE ATLAS OF PRELIMINARY GEOLOGIC QUADRANGLE MAPS OF PENNSYLVANIA, 1981.

LEGEND

Geologic Contact

Dck Catskill Formation

Dtr Trimmers Rock Formation (Lock Haven & Brallier Fms.)



LYCOMING COUNTY
WATER SUPPLY STUDY

PICTURE ROCKS GEOLOGIC MAP

drawn	checked	approved	figure no.
KAA	KSA	MDH	5-6
date 02/05/01	date 02/06/01	date 02/07/01	
job no. 01-1408-00-1219-006		file no. 1219-004-A	

Science Applications International Corporation
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Note: The exact location of groundwater wells, surface water intake, storage tank, and pumping stations must be determined by thorough hydrogeologic and engineering studies.

NAME: LAYOUT1-K:\DRAFTING\LYCOMING_CO\1219-004.DWG DATE: JAN 24, 2001 TIME: 9:52 AM CTB: NONE

3. ANTICIPATED WATER SYSTEM DEVELOPMENT COSTS

There do not appear to be prohibitions to any of the alternatives, with the exception of Elimsport for which there is no feasible connection. Therefore, the economics of each alternative become a major factor in alternative selection. The estimated development costs for each alternative are shown in Table 24. These cost estimates are general and for comparison purposes only.

The largest costs by far are those for storage and distribution; the assumptions are as follows:

- Standpipes are used for all systems except for Elimsport,
- A one-half acre parcel is needed for each water storage tank,
- Single day storage is needed for groundwater and interconnection sources,
- Three days storage is needed for stream intakes,
- Source water force mains are 4-inch diameter,
- Distribution mains are 8-inch diameter
- Distribution main length is based on an average of 123 GPD and 50 feet per connection

For interconnection sources, the assumptions are as follows:

- The supply water is treated
- A booster pump is needed in each new service area
- A one-half acre parcel is needed for each pump station

For groundwater sources, the assumptions are as follows:

- A primary and back-up well are needed,
- A one-half acre parcel is needed for each well,
- High-capacity 8-inch diameter wells are needed to provide for additional growth,
- Treatment is by chlorination,
- A one-half parcel is needed for each treatment building

For surface water sources, the assumptions are as follows:

- A single stream intake is needed
- A one-half acre parcel is needed for each intake,
- Treatment is by standard filtration and chlorination,
- A one-half parcel is needed for each treatment building

Table 24
Summary of Development Costs for Source Alternatives
County Water Supply Plan
Lycoming County Planning Commission

Potential		unit cost	Interconnection		Groundwater		Surface Water	
Service Area	capital cost item	(est.)	unit	cost	unit	cost	unit	cost
Trout Run	8" dia. well / pump	$31,000	1	$31,000	2	$62,000		
29,626	stream intake / pump	$75,000					1	$75,000
GPD	treatment building	$85,000	1	$85,000	1	$85,000	1	$85,000
	filtration	$31,718					1	$31,718
	standpipe	$67,399	1	$67,399	1	$67,399	3	$202,197
	booster pump station	$25,000	1	$25,000				
	supply force main	$25	500	$12,500	1,200	$30,000	1,500	$37,500
	distribution mains	$35	12,043	$421,508	12,043	$421,508	12,043	$421,508
	land acquisition	$10,000	2.0	$20,000	2.0	$20,000	2.5	$25,000
	subtotal			$662,407		$685,907		$877,924
	eng./legal/admin	25%		$165,602		$171,477		$219,481
	total			**$828,009**		**$857,384**		**$1,097,405**
Lairdsville	8" dia. well / pump	$31,000			2	$62,000		
17,892	stream intake / pump	$75,000					1	$75,000
GPD	treatment building	$85,000			1	$85,000	1	$85,000
	filtration	$31,711					1	$31,711
	standpipe	$40,704	1	$40,704	1	$40,704	3	$122,113
	booster pump station	$25,000	1	$25,000				
	supply force main	$25	35,000	$875,000	900	$22,500	2,000	$50,000
	distribution mains	$35	7,273	$254,561	7,273	$254,561	7,273	$254,561
	land acquisition	$10,000	1.0	$10,000	2.0	$20,000	2.5	$25,000
	subtotal			$1,205,265		$484,765		$643,385
	eng./legal/admin	25%		$301,316		$121,191		$160,846
	total			**$1,506,582**		**$605,957**		**$804,231**
Elimsport	8" dia. well / pump	$31,000			2	$62,000		
14,263	stream intake / pump	$75,000					1	$75,000
GPD	treatment building	$85,000			1	$85,000	1	$85,000
	filtration	$31,709					1	$31,709
	elevated tank	$103,407	1	$103,407	1	$103,407	3	$310,220
	booster pump station	$25,000	1	$25,000				
	supply force main	$25	40,000	$1,000,000	700	$17,500	5,000	$125,000
	distribution mains	$35	5,798	$202,929	5,798	$202,929	5,798	$202,929
	land acquisition	$10,000	1.0	$10,000	2.0	$20,000	2.5	$25,000
	subtotal			$1,341,336		$490,836		$854,858
	eng./legal/admin	25%		$335,334		$122,709		$213,714
	total			**$1,676,670**		**$613,545**		**$1,068,572**

Table 24 (cont'd)
Summary of Development Costs for Source Alternatives
County Water Supply Plan
Lycoming County Planning Commission

Potential		unit cost	Interconnection		Groundwater		Surface Water	
Service Area	capital cost item	(est.)	unit	cost	unit	cost	unit	cost
Farragut	8" dia. well / pump	$31,000			2	$62,000		
29,626	stream intake / pump	$75,000					1	$75,000
GPD	treatment building	$85,000			1	$85,000	1	$85,000
	filtration	$31,718					1	$31,718
	standpipe	$67,399	1	$67,399	1	$67,399	3	$202,197
	booster pump station	$25,000	1	$25,000				
	supply force main	$25	13,000	$325,000	700	$17,500	5,000	$125,000
	distribution mains	$35	12,043	$421,508	12,043	$421,508	12,043	$421,508
	land acquisition	$10,000	1.0	$10,000	2.0	$20,000	2.5	$25,000
	subtotal			$1,523,907		$673,407		$965,424
	eng./legal/admin	25%		$380,977		$168,352		$241,356
	total			**$1,061,134**		**$841,759**		**$1,206,780**
Picture Rocks	8" dia. well / pump	$31,000			2	$62,000		
79,085	stream intake / pump	$75,000					1	$75,000
GPD	treatment building	$85,000			1	$85,000	1	$85,000
	filtration	$31,748					1	$31,748
	standpipe	$179,918	1	$179,918	1	$179,918	3	$539,755
	booster pump station	$25,000	1	$25,000				
	supply force main	$25	12,000	$300,000	900	$22,500	1,500	$37,500
	distribution mains	$35	32,148	$1,125,193	32,148	$1,125,193	32,148	$1,125,193
	land acquisition	$10,000	1.0	$10,000	2.0	$20,000	2.5	$25,000
	subtotal			$1,640,111		$1,494,611		$1,919,196
	eng./legal/admin	25%		$410,028		$373,653		$479,799
	total			**$2,050,139**		**$1,868,264**		**$2,398,996**

4. RECOMMENDED SOURCE ALTERNATIVES

The evaluation of available water resources has revealed that all three alternatives are available to most of the potential new service areas. Interconnection is preferred due to reasons outlined previously, although the costs can be relatively high due to force main lengths. In most cases, groundwater is the least costly to develop and is therefore the recommended alternative for most new service areas. In final selection of a source, consideration must also be given to the operational, organizational, and financial aspects of creating new community systems in areas where none currently exist.

Trout Run also has the option of interconnection since it is the only potential service area that is located in close proximity to an existing water system, Bittner's Mobile Home Park (MHP). Bittner's MHP is reported to have one well with a safe yield of 50,000 gpd. The projected 2020 peak demand for Bittner's MHP is only 7,000 gpd, thus 43,000 gpd may be available to Trout Run. The costs shown in Table 24 assume that only one added well and an upgraded treatment system would be needed.

Of the five foregoing unserved areas, Picture Rocks is most strongly recommended for public water. The Borough's current substantial population together with its higher density and projected growth in residential and nonresidential usage make the provision of reliable potable water here a high priority. As the Hughesville system has expressed an interest in serving Picture Rocks and has sufficient safe yield to do so, this alternative should be explored first. While the interconnection alternative appears slightly more costly than the groundwater alternative, in fact, it may well be ultimately less expensive because the standpipe could be shared with the Hughesville system and because a single integrated system would permit lower operational, maintenance, and administrative costs not reflected in Table 24.

As Williamsport's planned future service area extends to about a mile from the Farragut area, this system could potentially provide service, though a stream crossing would be involved. The remaining two unserved areas are not sufficiently close to strong public systems with which they might reasonably physically interconnect. Current and future projected populations in these areas are also relatively low. Where existing groundwater pollution problems are due primarily to malfunctioning septic systems, it will likely be more cost effective for these systems to be repaired or replaced than for a new public water system to be developed. At the same time, existing homeowners should consider the replacement of any ungrouted, malfunctioning or poorly sited wells that may be contributing to the problem. In-home disinfection could be provided until the sewage problems are corrected, and other means of preventing such problems in the future could be implemented (see Chapter IV-18-19).

Any proposed new community water systems will only be able to obtain a construction permit if the financial part of the required business plan can provide assurances of revenues and cash flow to cover the cost of construction and operation and maintenance of the systems for at least five full years. The limited rate bases of these unserved areas

would likely result in annual debt service per connection that would be prohibitive, without outside financial assistance.

C. EXISTING SYSTEMS WITH PROJECTED SHORTFALLS

1. WATER DEMAND PROJECTIONS

Based on the water system summaries, five existing water systems are projected to have water supply shortfalls in the year 2020 unless additional resources are obtained. The locations of these water systems are illustrated on Figure 5-7. Table 25 summarizes the current safe yield, projected peak demand, and projected peak shortfall for each of these five water systems. Most of the projected shortfalls are minor.

2. SOURCE ALTERNATIVES

These five water systems are each located in the proximity of aquifers that are capable of meeting the projected 2020 peak demand (Figures 5-8 through 5-12). Information regarding the geology and aquifer characteristics beneath each area is shown on the figures. Surface water is not readily available for use, and only Village Water Inc., has the potential for interconnection to a nearby system with a projected surplus.

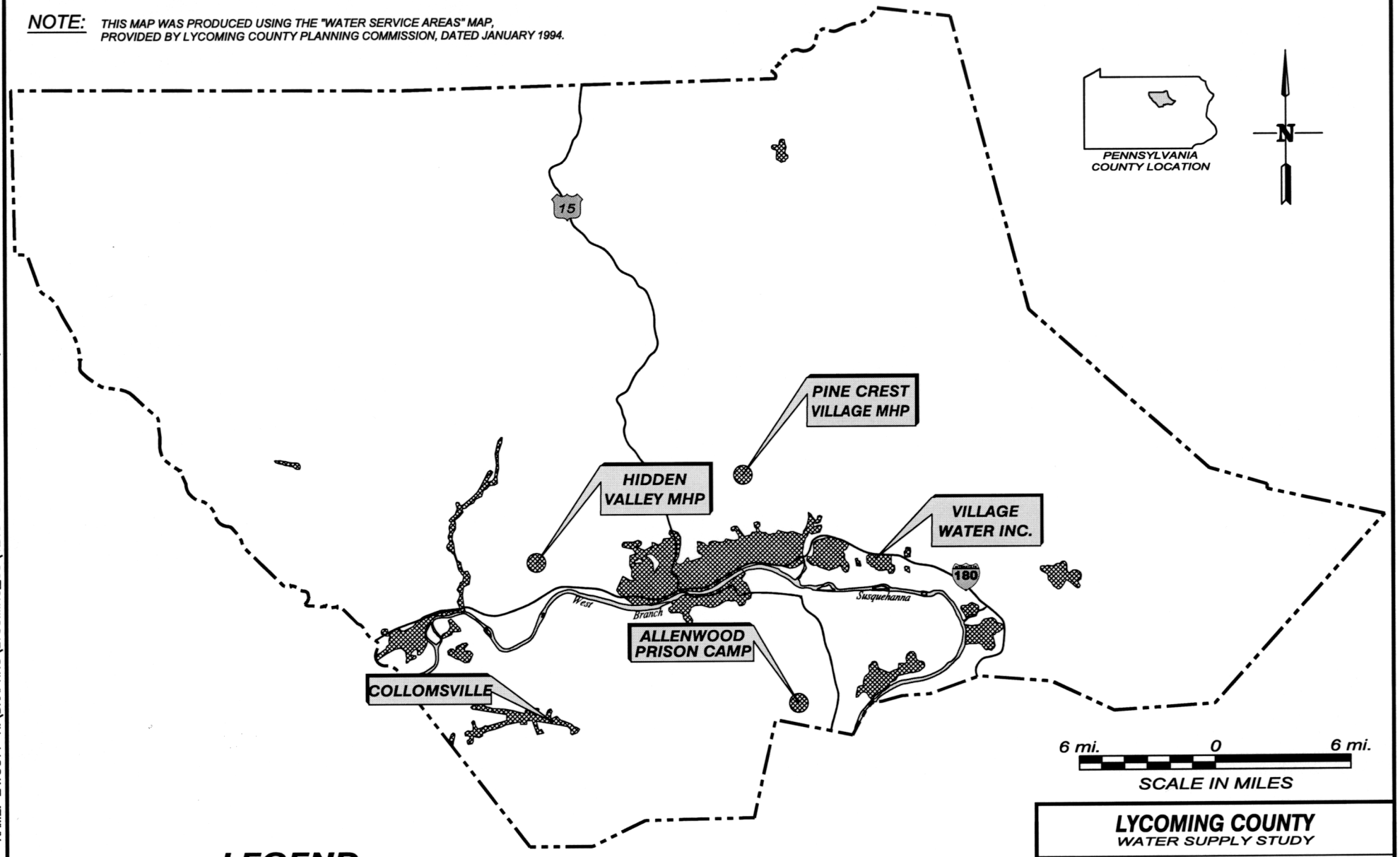
3. RECOMMENDED SOURCES

Currently, each of these water systems relies exclusively on groundwater as its source. Additional groundwater resources are readily available in each service area, whereas surface water and interconnection resources are limited. Therefore, groundwater is the recommended resource alternative to meet projected demands.

Village Water, Inc., appears to be the only existing system with the potential to obtain its projected 2020 peak shortfall from another source. Twin Hills, located approximately one-half mile to the east, is projected to have an estimated surplus of nearly 12,000 gpd in 2020. This surplus would meet Village Water, Inc.'s, projected shortfall and could be a cost-effective alternative to meet future demand.

With the exception of Allenwood, the shortfalls can be readily met with installation of new back-up wells. Collomsville and Hidden Valley show very high per capita water use, which could be reduced through conservation practices and the implementation of active leak detection programs. Due to the relatively large projected requirement, Allenwood requires an additional new supply well. A thorough hydrogeologic and engineering study must be performed prior to any water resource development project.

NOTE: THIS MAP WAS PRODUCED USING THE "WATER SERVICE AREAS" MAP, PROVIDED BY LYCOMING COUNTY PLANNING COMMISSION, DATED JANUARY 1994.



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LEGEND

WATER SERVICE AREA

LYCOMING COUNTY
WATER SUPPLY STUDY

Location of Existing Systems with Protected 2020 Deficit

drawn WAA	checked ESA	approved MDH	figure no. 5-7
date 02/05/01	date 02/01/01	date 02/07/01	
job no. 01-1408-00-1219-000		file no. 1219-SLM-A	

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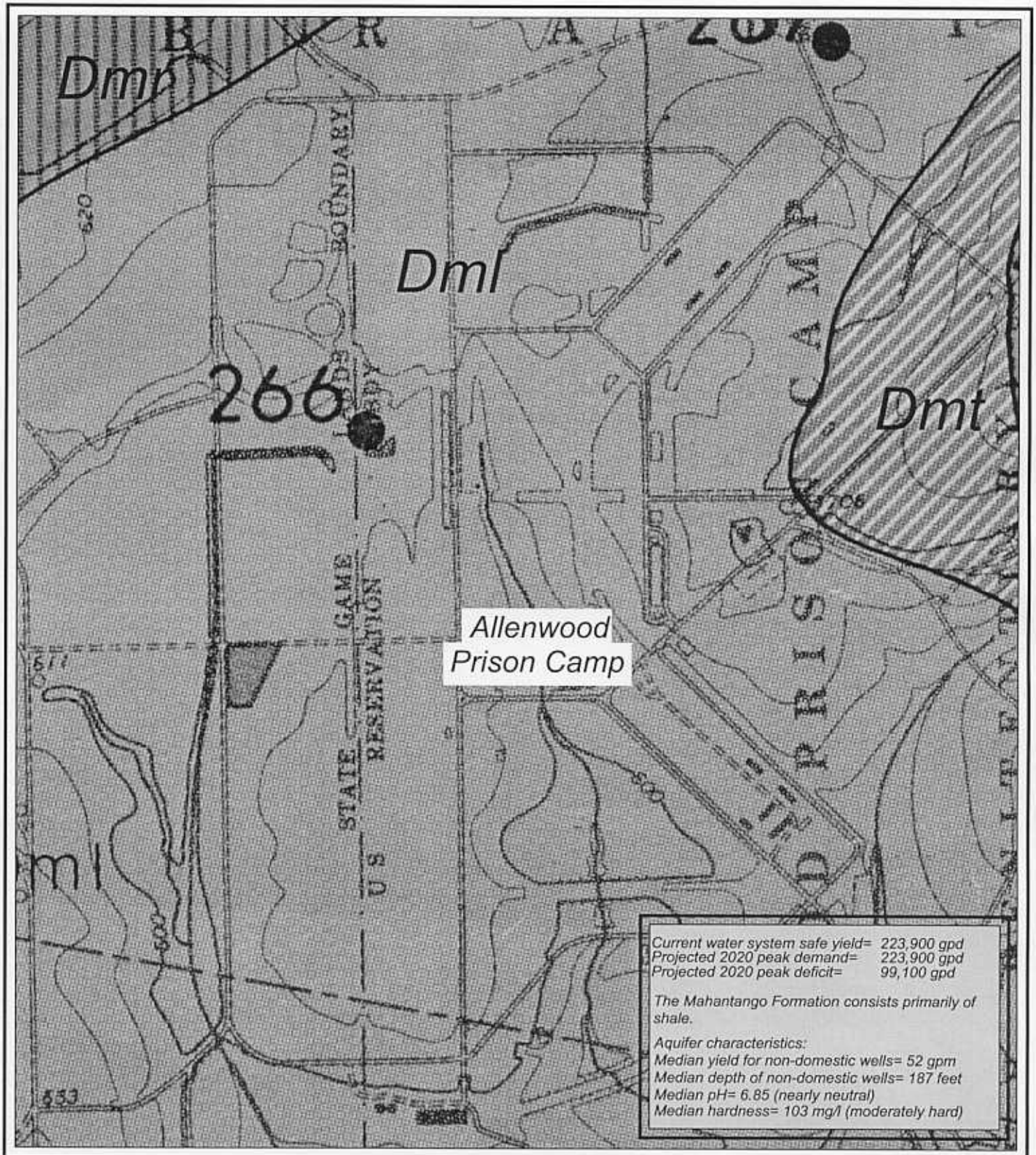
Table 25
Projected 2020 Water Supply Shortfall For Five Existing Water Supply Systems
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	2000 Supply Safe Yield (gpd)	Projected 2020	
		Peak Demand (gpd)	Peak Shortfall (gpd)
Allenwood Prison Camp	223,900	323,000	99,100
Collomsville Mutual Waterworks	30,000	39,900	9,900
Hidden Valley MHP	6,000	6,650	650
Pinecrest MHP	11,500	12,400	900
Village Water Inc.	252,000	254,400	2,400

Note: gpd = gallons per day
Pinecrest MHP safe yield is unknown, but assumed to be at least equal to the current average daily demand.



NOTE: GEOLOGY AND MAP IS BASED UPON THE GEOLOGIC AND HYDROLOGIC MAP OF THE WILLIAMSPORT REGION, LYCOMING COUNTY, PENNSYLVANIA, 1981.

LEGEND

- Geologic Contact
- Dml/Dmt- Mahantango Formation
- Dmr- Marcellus Formation

PENNSYLVANIA QUADRANGLE LOCATION

N

0' 1000'
SCALE IN FEET

LYCOMING COUNTY
WATER SUPPLY STUDY

ALLENWOOD PRISON CAMP GEOLOGIC MAP

drawn	checked	approved	figure no.
WAA	ESA	MDH	5-8
date 02/05/01	date 02/06/01	date 02/07/01	
job no. 01-1408-00-1219-006	file no. 1219-004-A		

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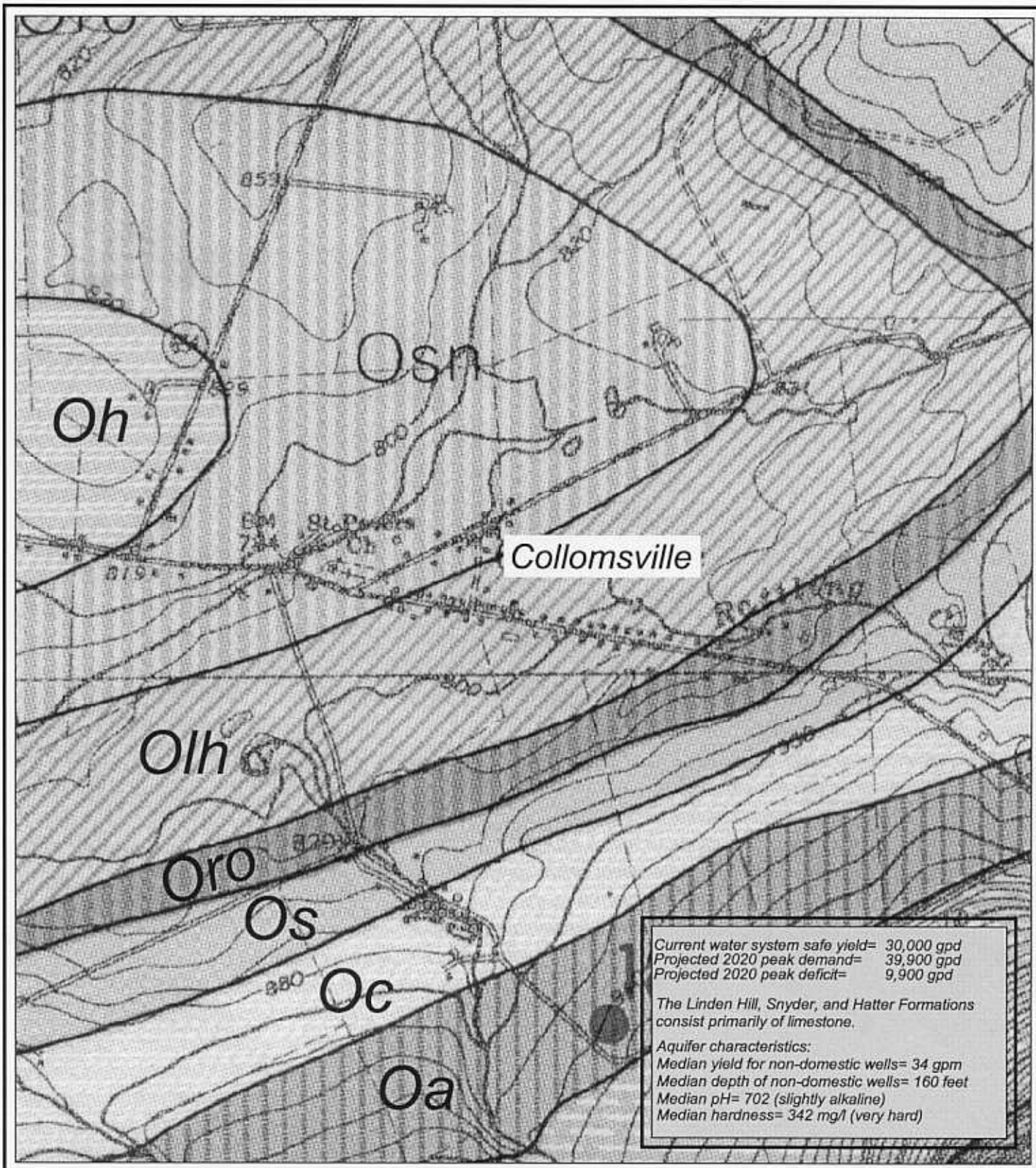

NOTE: GEOLOGY AND MAP IS BASED UPON THE GEOLOGIC AND HYDROLOGIC MAP OF THE WILLIAMSPORT REGION, LYCOMING COUNTY, PENNSYLVANIA, 1981.

LEGEND

- Geologic Contact
- Or- Reedsville Fm.
- Oa- Antes Fm.
- Oc- Coburn Fm.
- Os- Salona Fm.
- Oro- Rodman Fm.
- Olh- Linden Hall Fm.
- Osn- Snyder Fm.
- Oh- Hatter Fm.

PENNSYLVANIA QUADRANGLE LOCATION

N

0' 1000'
SCALE IN FEET

LYCOMING COUNTY
WATER SUPPLY STUDY

COLLOMSVILLE GEOLOGIC MAP

drawn	checked	approved	figure no.
WAA	KSA	MDH	5-9
date 02/05/01	date 02/06/01	date 02/07/01	
job no. 01-1408-00-1219-006	file no. 1219-004-A		

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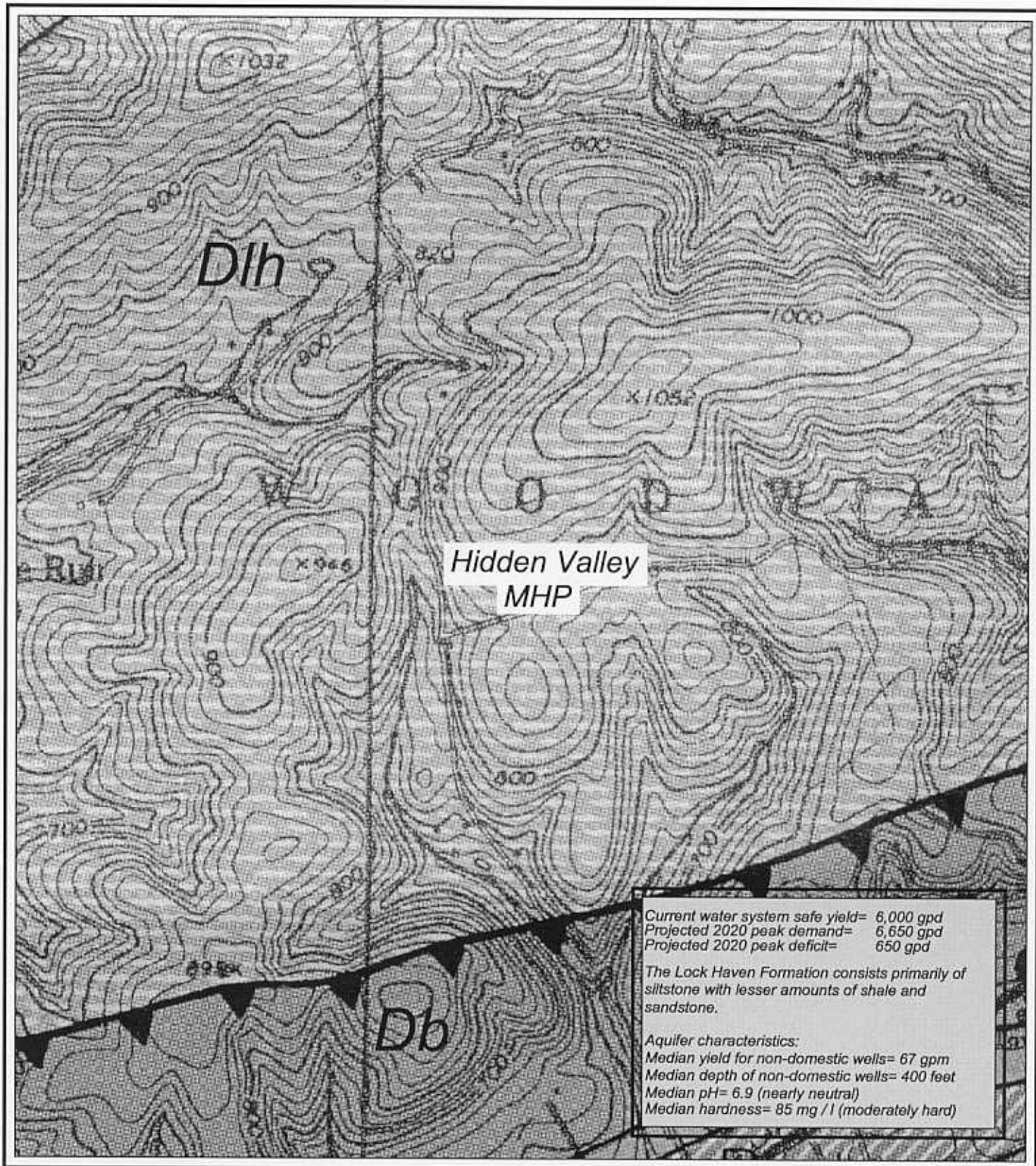

NOTE: GEOLOGY AND MAP IS BASED UPON THE GEOLOGIC AND HYDROLOGIC MAP OF THE WILLIAMSPORT REGION, LYCOMING COUNTY, PENNSYLVANIA, 1981.

LEGEND

- Geologic Contact
- Thrust Fault
- Dlh- Lock Haven Formation
- Db- Brailler Formation

0' 1000'
SCALE IN FEET

LYCOMING COUNTY
WATER SUPPLY STUDY

HIDDEN VALLEY MHP GEOLOGIC MAP

drawn	checked	approved	figure no.
WAA	RSA	MDH	5-10
date 02/05/01	date 02/06/01	date 02/07/01	
job no. 01-1408-00-1219-006	file no. 1219-004-A		

Science Applications International Corporation
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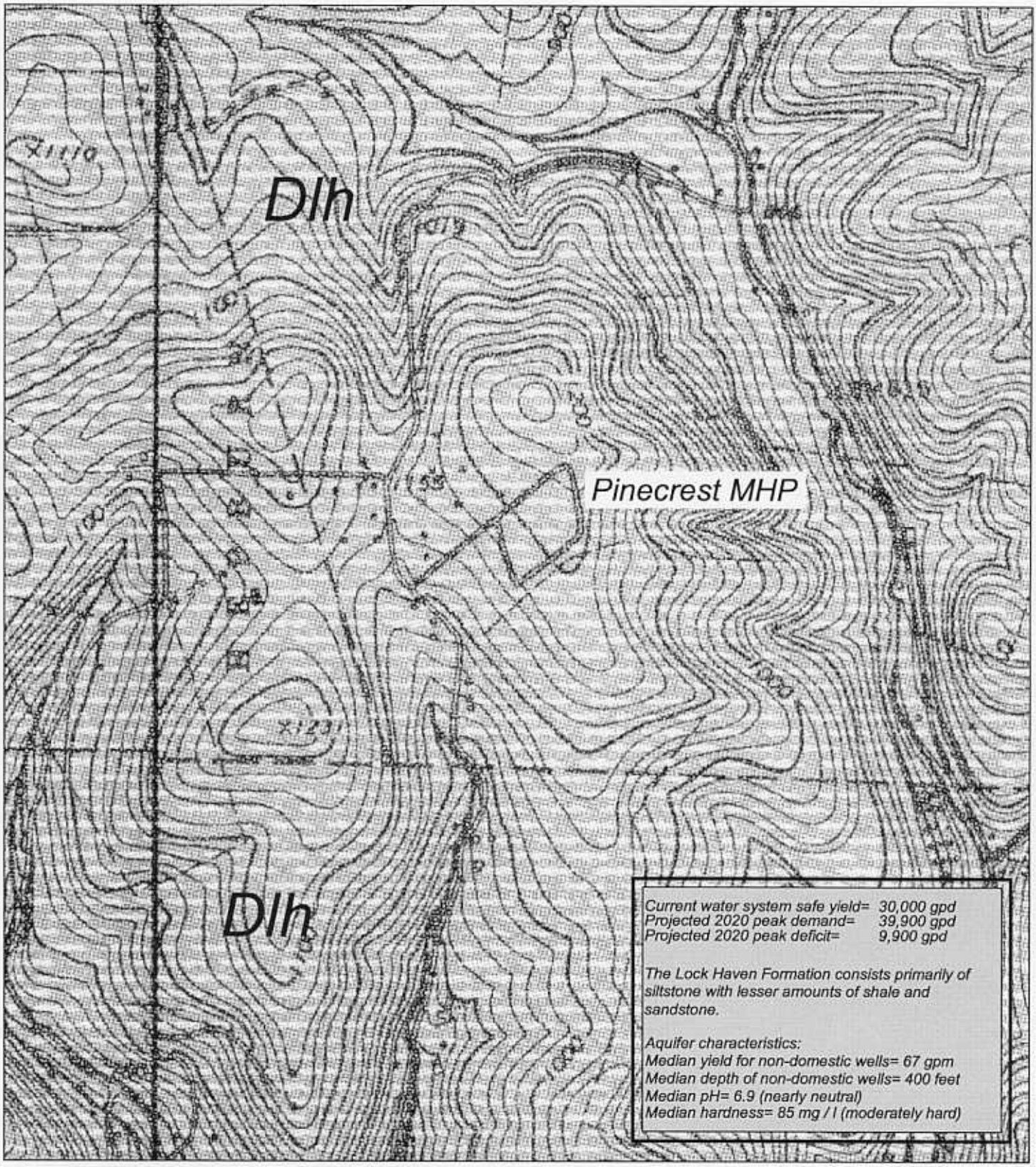

NOTE: GEOLOGY AND MAP IS BASED UPON THE GEOLOGIC AND HYDROLOGIC MAP OF THE WILLIAMSPORT REGION, LYCOMING COUNTY, PENNSYLVANIA, 1981.

LEGEND

Geologic Contact

Dlh Lock Haven Formation

LYCOMING COUNTY
WATER SUPPLY STUDY

PINECREST MHP GEOLOGIC MAP

drawn	checked	approved	figure no.
WAA	KSA	MDH	5-11
date 02/05/01	date 02/06/01	date 02/07/01	
job no. 01-1408-00-1219-006	file no. 1219-004-A		

SAIC Science Applications International Corporation
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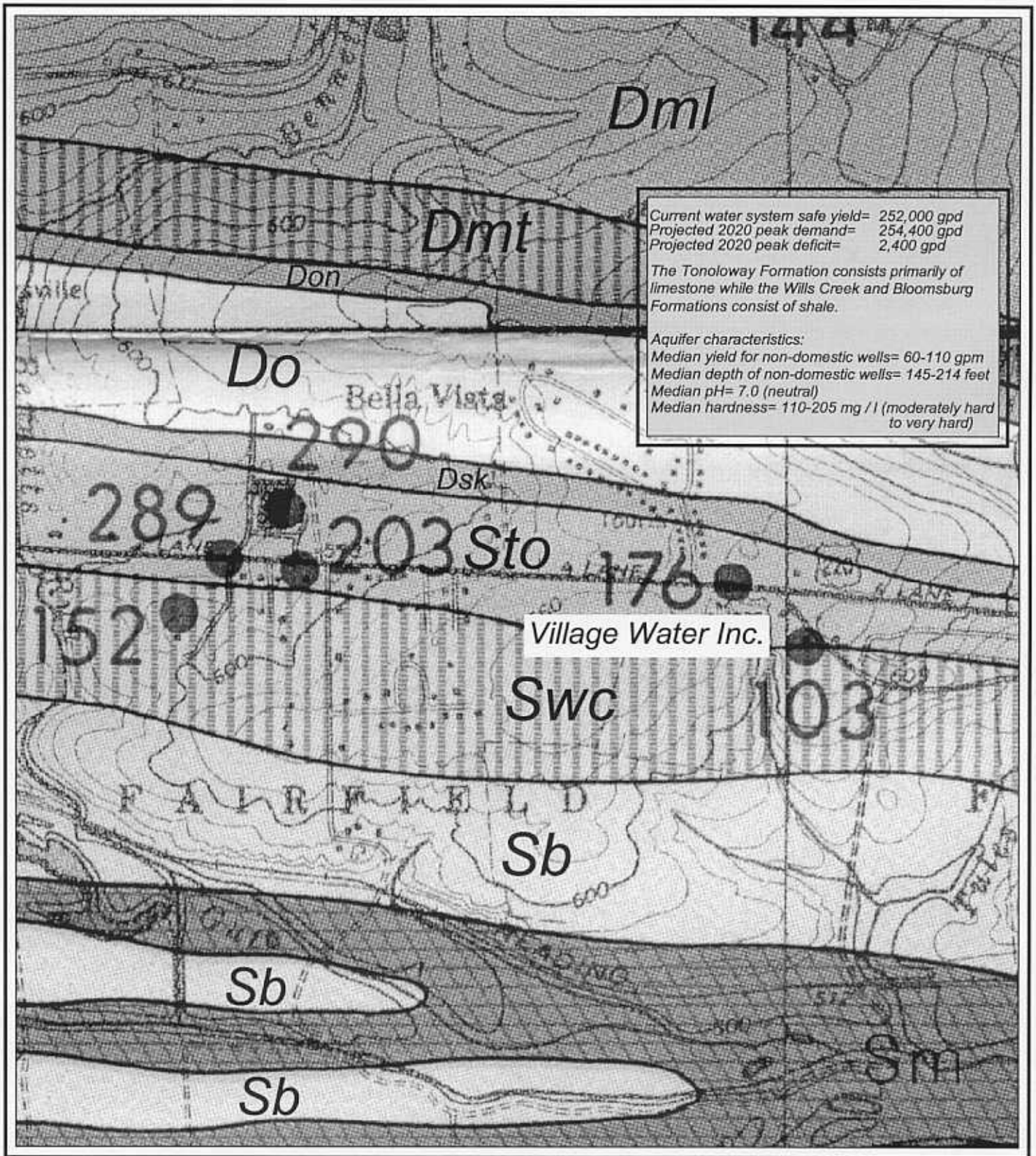

NOTE: GEOLOGY AND MAP IS BASED UPON THE GEOLOGIC AND HYDROLOGIC MAP OF THE WILLIAMSPORT REGION, LYCOMING COUNTY, PENNSYLVANIA, 1981.

LEGEND

	Geologic Contact		
Dml-	Mahantango Fm.	Sto-	Tonoloway Fm.
Dmr-	Marcellus Fm.	Swc-	Wills Creek Fm.
Don-	Onondaga Fm.	Sb-	Bloomsburg Fm.
Do -	Old Port Fm.	Sm-	Mifflintown Fm.
Dsk-	Keyser Fm.		

0' 1000'
SCALE IN FEET

LYCOMING COUNTY
WATER SUPPLY STUDY

VILLAGE WATER INC.
GEOLOGIC MAP

drawn	checked	approved	figure no.
WAA	KSA	MDH	5-12
date 02/05/01	date 02/06/01	date 02/07/01	
job no. 01-1408-00-1219-006		file no. 1219-004-A	

SAIC Science Applications International Corporation
An Employee-Owned Company

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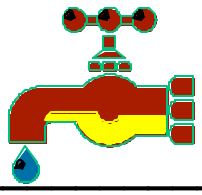


VI. SOURCE WATER PROTECTION

A. INTRODUCTION

The Safe Drinking Water Act (SDWS) Reauthorization of 1996 includes new requirements of states and public water systems and provides many new opportunities to assure public health and safety through proactive approaches. The Act requires states to develop a Source Water Assessment and Protection (SWAP) Program to assess the drinking water sources that serve public water systems for their susceptibility to pollution and to use this information as a basis for eventually building voluntary, community-based barriers to drinking water contamination.

The assessments, to be completed by DEP, will provide rigorous delineation of wellhead protection areas for groundwater sources or critical watershed areas for surface water sources, a base inventory of existing and potential sources of contamination for each source water protection area, and a susceptibility analysis of the drinking water source to contamination. These assessments will provide communities and water suppliers with information that they will need to make informed decisions on how to best protect their drinking water supplies. Source water protection grants, technical support, and loans will be available from DEP for municipalities and water suppliers to develop local source water protection programs. A DEP Fact Sheet further describing the SWAP Program is included in Appendix S. To avoid duplication and increase efficiency, Congress urged states to make use of state wellhead protection programs. Pennsylvania's Wellhead Protection (WHP) Program serves as the cornerstone of the SWAP Program.

This chapter first presents an inventory of major federal and state-identified contaminant sources that were provided by a commercial environmental data base management firm as well as local-identified contaminant sources. These data can be used by existing and potential new community water systems to site new public water wells away from known potential contaminant sources. This chapter also presents a discussion of source water protection and an example Wellhead Protection Workbook, which sets forth a five-step process that communities can follow to protect their wells from potential contamination. A description of a wide variety of voluntary and regulatory approaches to groundwater protection and their applicability is included.

B. CONTAMINANT SOURCE IDENTIFICATION

Degraded water quality occurs when contaminants enter surface or groundwater sources. Community water systems and municipalities that must rely on groundwater to meet future water needs should take action now to protect the resources from potential contamination. Wellhead protection programs can offer a far more effective and less expensive approach to assuring continued clean water than cleaning up after contamination occurs.

While a primary component of a wellhead protection program should be to avoid the siting of new wells near potential contaminant sources around existing and future community wellhead locations, such a program should also include mitigation of any potential adverse impacts of existing contaminant sources at these locations. Lycoming County has several industrial and commercial sites of concern. In addition, significant rural development has resulted in a proliferation of on-lot sewage disposal systems, which have come to constitute another potential contaminant threat.

1. FEDERAL AND STATE DATABASES

Potential contaminant sources have been identified and located using a combination of approaches. First, the services of a data-gathering provider, VISTA Information Solutions, Inc., was used to search 41 major federal, State and other databases, 20 of which have data on Lycoming County. Each of these databases is described in the inset on pages 4 and 5, while the detailed findings are listed in Appendix G. Mapped locations are shown on Figures 6-1 through 6-9. The type and number of potential contaminant sources found within Lycoming County and their numbers are shown in Table 26.

The major potential "point sources" of contamination identified in Table 26 are primarily underground storage tanks. There is frequent duplication in the foregoing listing, both in contaminant source sites identified and in number of incidents. For instance, an Underground Storage Tank might also be a Leaking Underground Storage Tank as well as the site of a RCRA Large Generator. Also, a given incident at a site that is reported through two possible reporting channels is sometimes listed twice, particularly ERNS incidents.

A total of 1,273 mapped and 537 unmapped federal, state and other records (inclusive of all sites) are reported in this database. For all sites, information is provided on the name and address of the facility, and the type of contaminant source, if applicable. Additional information is provided on the date of the pollution event, the substance or material released, and the precise location (latitude and longitude) of the site. An electronic version of the entire database has been provided to Lycoming County for purposes of creating a complete Geographic Information System coverage.

Two additional contaminant sources that should be further investigated by Lycoming County for incorporation into a Geographic Information System are the National Pollution Discharge Elimination System (NPDES) Permitted Discharge points and the location of any major oil pipelines. An NPDES listing would include the County's sewage treatment plant discharge points and possibly other discharge points. Lycoming County should contact the PA DEP to obtain this data.

FEDERAL, STATE AND OTHER CONTAMINANT SOURCE DATABASES

AST: Aboveground Storage Tanks (see UST); State, Regional and County database: This database is provided by the State Water Resources Control Board.

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System (see also NFRAP); Federal EPA database: This database contains an extract of approximately 15,000 sites nationally identified as hazardous sites that have been investigated or are in the process of investigation for contamination risk. Alias names for the sites are included as well as a listing of investigative, remediation, removal, and community relations activities or events, financial funding information for events, and any unrestricted enforcement activities.

CORRACTS: RCRA Corrective Action Sites; Federal EPA database: The EPA maintains this database of more than 6,300 RCRA facilities, which are undergoing "corrective action." A "corrective action order" is issued pursuant to RCRA Section 3008(h) when there has been a release of hazardous waste or constituents into the environment from a RCRA facility. Corrective actions also can be imposed as a requirement of receiving and maintaining a TSDF permit. Corrective actions may be required beyond the facility's boundary and can be required regardless of when the release occurred, even if it predates RCRA.

ERNS: Emergency Response Notification System; Federal EPA database: This EPA database contains information on reported releases of oil and hazardous substances. The data comes from spill reports made to the EPA, U.S. Coast Guard, the National Response Center and/or the Department of Transportation. Over 380,000 spills occurring since 1987 are included.

FEDERAL WATER WELLS: USGS Water Wells; Federal database: The Ground Water Site Inventory (GWSI) database was provided by the United States Geological Survey (USGS). The database contains information for over 1,000,000 wells and other sources of groundwater which the USGS has studied, used, or otherwise had reason to document through the course of research.

FINDS: Facility Index System Database: This system was developed to help identify and cross reference which sections or departments within EPA maintain a file on any specific site. This data also includes any file numbers or case numbers.

LUST: Leaking Underground Storage Tanks; State, Regional, and County database: Leaking underground storage tanks are a major cause of soil and groundwater contamination. Along with stricter regulation of USTs, most states now maintain lists of reported LUSTs. VISTA collects LUST databases from the 49 states and the District of Columbia. Only Kentucky does not maintain a LUST database.

NFRAP: No Further Remedial Action Planned; Federal database: These are sites which have been removed from CERCLIS. After initial investigation, either no contamination was found, contamination was removed quickly, or the contamination was not serious enough to require Federal Superfund action or NPL consideration.

NPL: National Priority List; Federal EPA database: This database includes a listing of all U. S. EPA National Priority List sites. These sites fall under the EPA's Superfund program established to fund cleanup of contaminated sites that pose risk to human health and the environment.

RCRIS: Resource Conservation Recovery Act Information System; Federal EPA databases: Generally, including Generators (large and small), transporters, and violations. These databases provide selective information on sites which generate, transport, store, treat, or dispose of hazardous wastes. Other databases, which fall under the general rubic of RCRA are Corrective Actions (CORRACTS); Treatment, Storage, and Disposal (TSD) facilities; and TSD-CORRACTS site/facilities.

SPL and SCL: State Priority List and State Cleanup Lists; State databases: Some 37 states maintain one or more databases containing listings of sites with known or suspected contamination. There is no standard or legal definition for a State Priority List (SPL) or State Cleanup List (SCL). In general, VISTA classifies a list as a State Priority List (SPL) only if confirmed sites are included and the state is involved in cleanup activities or is actively pursuing responsible parties. Other lists containing unconfirmed sites or sites where no further action is expected are classified as State Cleanup Lists. Often, SCLs will contain some priority sites as well.

SWLF: Solid Waste Landfill Sites; State, Regional, and County databases: VISTA has perhaps the most comprehensive list available anywhere of solid waste sites nationally. Collected at the state and, sometimes, local level, this database brings together data from every state except Alaska. Depending on the state, these lists may include active landfills, inactive landfills, incinerators, transfer stations, recycling locations, and other facilities where solid waste is treated or stored.

TRIS: Toxic Release Inventory System Database; Federal EPA database: This database includes annual reporting by all owners or operators of facilities which manufacture, process, or import toxic chemicals in quantities exceeding 25,000 pounds annually, as required by SARA Title III, Section 313 of EPCRA (SARA Title III). Annual reports concerning chemical releases since 1987 are included. The data becomes available about 18 months after the reporting year ends. Overall reporting covers about 25,000 to 30,000 sites annually.

UST: Underground Storage Tank Registrations; State, Regional, and County databases: USTs regulated under Subtitle 1 of the Resource Conservation and Recovery Act (RCRA) must be registered with the state agency responsible for administering the UST program. VISTA has collected tank registration information from the 49 states, which make them available. Only South Dakota will not release this information to the public. Some states require registration of aboveground tanks (ASTs) as well. Note that various states also exempt certain types of tanks, most notably smaller heating oil tanks for residential use.

2. LOCAL CONSULTATION

Lycoming County's GIS database inventory includes coverages for several potential contaminant sources, including, most significantly, Hazardous Material SARA III Sites, as well as railroads and airports. This data should be made available to municipalities and community water systems to assist them in protecting groundwater resources. In addition, community water systems were asked in a survey whether they had any concerns about existing or potential nearby activities that could pose a threat to their system's water quality and whether they had undertaken any wellhead protection efforts.

Finally, systems were asked whether their water becomes cloudy or turbid or undergoes temperature changes after storm events, whether their wells are less than 50 feet deep and whether their wells are within 200 feet of a surface water source. The first two of these three factors are considered by the DEP to be indicators of possible surface water influence. While a well's location within 200 feet of a surface water source is no longer considered by the DEP to be such an indicator, this information may nevertheless be of value to systems and municipalities in evaluating their vulnerability to water pollution. A summary of system survey wellhead protection responses is found in Table 27.

Table 27 indicates that, of those responding systems, several have concerns with possible water contaminant sources including agricultural, transportation and land use practices, uncapped abandoned wells, well drilling and nearby garbage burning. Several systems have source wells that are within 200 feet of a surface water source, while a few have shallow wells of less than 50-foot depth. Several systems indicate that they have undertaken wellhead efforts, most of these security precautions at the wellhouse. The Montoursville Boro Waterworks is the only system with a DEP-approved wellhead protection plan, while the Montgomery Borough Water and Sewer Authority is developing such a plan. All of the County's community water systems should be encouraged to work with neighboring municipalities to develop such a plan, using the Wellhead Protection Workbook that follows.

C. SOURCE WATER PROTECTION

The long-term protection of water quality in the County is essential to the continued availability of potable water to the County’s public water suppliers. Several types of regulatory and non-regulatory protection techniques exist that could be used to protect the County’s groundwater and surface water sources for existing the potential future use. For instance, the delineation of Wellhead Protection Areas (WHPAs) and the adoption of regulatory measures to protect community water system supply wells would safeguard not only existing wells, but also potential future wells.

Other broader methods of source water protection, including aquifer and watershed protection and management, exist to protect water sources from contamination. These include various zoning, subdivision, and land development conditions, and other approaches such as the following:

- Land purchase or easement acquisition,
- Creation of regional watershed associations,
- Very low-density zoning, including cluster and rural conservation zoning that requires large areas to be retained in a natural state,
- On-lot septic maintenance, cleaning and replacement regulations,
- On-lot water system well construction and abandonment requirements, and demonstration of adequate supply,
- The promotion of Integrated Pest Management Practices on farms and in gardens,
- Annual hazardous materials collection days,
- Identification and careful monitoring of hazardous materials production, use, storage, transport, and disposal (see County's GIS database),
- Up-to-date municipal Emergency Operations Plans,
- Zoning protection for floodplains, wetlands, riparian corridors, steep slopes, and woodland areas, low maximum impervious surface standards and the promotion of pervious surfaces for development,
- Best management practices for storm water management, including the promotion of non-structural solutions and other techniques,
- Transfer of development rights programs,
- Non-regulatory approaches supporting the protection of groundwater include education, conservation, land acquisition, and easement acquisition, to name a few.

These techniques should be used around and upgradient of existing and potential future well and stream withdrawal sites for community water systems. The implementation of these techniques will require the cooperation and coordination of the efforts of municipalities, CWS's, the County Conservation District, Cooperative Extension, Lycoming County, and other participants.

With financial and technical assistance from the DEP, community water systems together with municipalities could initiate surface water protection zones as a primary means of identifying potential spill hazards. Three zones are used when watersheds are greater than 100 square miles. The first two zones (A and B) are largely based on time of travel (TOT), which is the distance a particle can travel in a given length of time under flow rate conditions for the specific stream. Zone A is delineated as ¼ mile on either side of the stream and an area ¼ mile upstream to the point from which a particle is five hours in travel time away. Zone B is the actual watershed area surrounding area A and extending upstream to a 25-hour TOT. Zone C is the remainder of the watershed. Surface water protection zones are recommended in those municipalities with surface water sources that are currently used or potentially could be used for public supplies.

All County water suppliers should be encouraged to complete the DEP 'Source Water Assessment Program' and enact wellhead and watershed protection plans. In addition, County and municipal zoning ordinances should be revised to require notification of public water suppliers of proposed land development activities within their watersheds (Zones A and B) or wellhead protection areas (at least Zones I and II). Activities such as subdivisions, developments, logging, mineral extraction and quarrying, highway construction, commercial and industrial development within these areas should be prohibited within Zone I wellhead protection areas (WHPAs). WHPA Zones II and III

should be required to exercise the highest level of water quality protection measures, such as following erosion and sedimentation control plans with maximum buffer zones approved by the County Conservation District. Application of DEP water quality protection standards to public water supply streams as published in the DEP 'Special Protection Waters Implementation Handbook' should be required by ordinance to projects within watershed protection Zones A and B. Agricultural operations in public water supply watersheds should be required to follow Best Management Practices as defined by the Nutrient Management Act and have updated conservation and nutrient management plans approved by the local County and federal resource conservation service professional personnel. Such plans should be written to include sound practices to prevent runoff of manure, soil, nutrients, herbicides, and pesticides into public water supply streams.

Finally, Lycoming County is located within the Susquehanna River basin, which is under the authority of the Susquehanna River Basin Commission (SRBC). The SRBC conducts a public review of proposed surface and groundwater uses, taking into consideration local concerns in evaluating requests for groundwater and surface water withdrawal permits. The SRBC and DEP can be contacted for more information on water resource permitting and protection.

D. WELLHEAD PROTECTION WORKBOOK (FOLLOWS TEXT)

A wellhead protection plan is a strategy to protect groundwater quality, particularly that of public supply wells, from potential contaminant threats. Historically, community water systems have been motivated to improve and expand their physical facilities in response to growing demands for water fueled by population growth. However, there has been no equivalent effort to protect the quality of groundwater sources, even as they are exposed to increasing levels of contaminant threats, except, typically, after contamination has already occurred. Wellhead protection is a proactive, preventative step that increasing numbers of communities are undertaking to avoid the potential loss or degradation of established public water sources. A sample Wellhead Protection Workbook follows the text.

> "Estimates of cleanup of contaminated water sources can be 30 to 40 times more costly than preventing them in the first place!" (EPA, 1995)

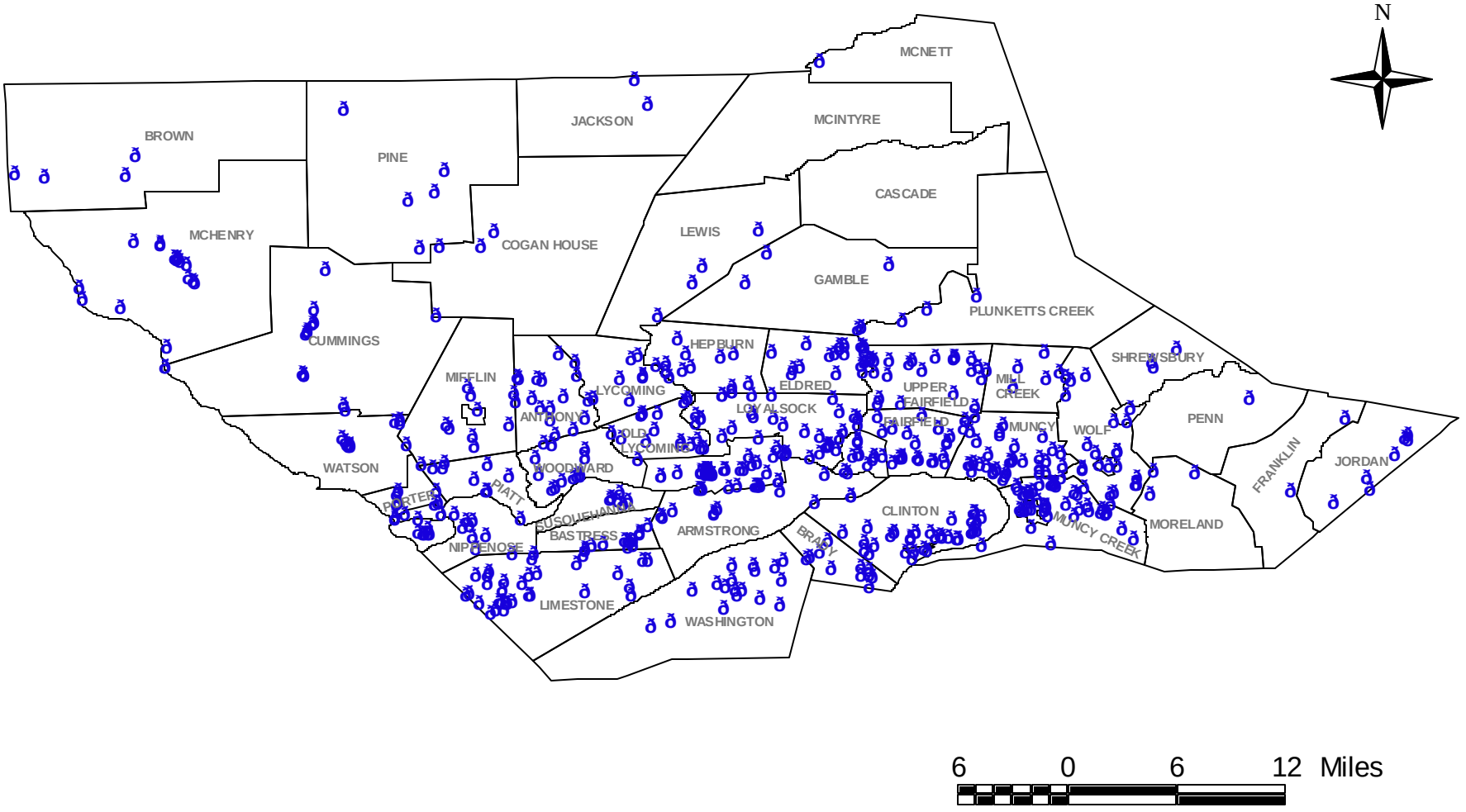
Table 26
Contaminant Source Inventory
County Water Supply Plan
Lycoming County Planning Commission

Contaminant Source Listing	Database Descriptions	Number of Mapped Locations	Number of Unmapped Locations	Report Figure Reference
Above Ground Storage Tanks	AST	45	40	6-9
RCRA Corrective Action Sites	CORRACTS	4	2	6-4
Comprehensive Environmental Responses, Compensation, and Liability Information System	CERCLIS	---	1	---
Locations in the Emergency Response Notifications System	ERNS	6	1	6-1
Facility Index System Database	FINDS	204	196	6-5
Federal Water Wells	FEDERAL WATER WELLS	608	---	6-1
RCRA Large Generator Locations	RCRIS	14	16	6-3
RCRA Small Generator Locations	RCRIS	113	67	6-3
State Leaking Underground Storage Tanks	LUST	88	61	6-8
Sites with No Further Remedial Action Planned	NFRAP	24	28	6-5
Sites on the National Priority List	NPL	1	---	6-4
State Cleanup List	SCL	---	11	---
State Priority List	SPL	---	1	---
State Solid Waste Landfill Sites	SWLF	22	12	6-2
RCRA Treatment Storage and Disposal Corrective Action Sites	RCRIS	2	2	6-2
Toxic Release Inventory System	TRIS	14	5	6-6
RCRA Transporter Sites	RCRIS	9	6	6-2
RCRA Treatment Storage and Disposal Sites	RCRIS	4	2	6-2
State Underground Storage Tanks	UST	84	66	6-7
RCRA Violators	RCRIS	31	20	6-4
Total Records		1273	537	

Table 27
Source Water Protection
County Water Supply Plan
Lycoming County Planning Commission

Community Water System	Concerns About Potential Contaminants	Potential Indicators of Surface Water Influence	Wellhead Protection Efforts
ABC #2 MHP	_	_	_
Allenwood Fed. Prison Camp	none	w/in 200' of surface water	none
American Tempo Village Park	_	_	_
Barto's Trailer Court	spraying of nearby fields	_	none
Bittner's MHP	_	_	_
Carpenters MHP	none	none	none
Cogan Valley MHP	uncapped abandoned wells; Rt. 15 and floodplain	w/in 200' of surface water, well < 50' deep	Notification to township of abandoned wells
Collomsville Mutual Waterworks	nearby highway	w/in 200' of surface water	None
Fairlawn Trailer Court	_	_	_
Foxcroft Manor MHP	_	_	_
Harvest Moon Trailer Court	_	_	_
Heatherbrook Estates MHP	_	_	_
Hidden Valley MHC	_	_	_
Hughesville Boro Water Auth.	Route 220 corridor	w/in 200' of surface water	Zone I protection
Jersey Shore Area Joint Water Auth.	None	w/in 200' of surface water, well < 50' deep	Zone I protection
Limestone Twp. Water Auth.	Ag and land use practices and septics	w/in 200’ of surface water	_
Loyalsock MHP	None	none	None
Meadowbrook MHP	None	well < 50' deep?	None
Montgomery Boro W & S Auth.	Ag. And land use practices	w/in 200' of surface water	plan being prepared
Montoursville Boro Waterworks	Well drilling in area	w/in 200' of surface water	DEP-approved plan
Mountain Laurel MHP	none	w/in 200' of surface water?	None
Muncy Boro Water Department	none	w/in 200' of surface water	Zone I protection
Muncy State Correctional Inst.	none	none	None
Oak-Lynn Manor MHP	_	_	_
Orchard MHP	none	> 50' water static level	well casing 2+' above cement floor
Pinecrest Village MHP	none	none	no tresspassing signs
Pleasant Pines MHP	none	none	None
Ralston Area Joint Auth.	none	none	concrete pads and protective pipes
Roaring Branch Waterworks	nearby garbage burning		Township garbage ordinance
Tiadaghton View MHP	_	_	_
Timberend Estates MHP	_	_	_
Twin Hills MHP	_	_	_
Vali-View MHP	_	_	_
Village Water Incorporated	none	w/in 200' of surface water	None
Waterville Water Association	none	well < 50' deep	None
Wilawan MHP	none	none	locked building w/50' no tresspassing
Williamsport Mun. Water Auth.	nearby ag., trans. & land use practices	w/in 200' of surface water, well < 50' deep	highway signage, SOC survey
County Totals	**7**	**14**	**7**
Countywide Percent	**19%**	**38%**	**19%**

_ = No survey response



Legend

- Federal Water Wells
- Township Boundaries

LYCOMING COUNTY

PENNSYLVANIA

FEDERAL WATER WELLS

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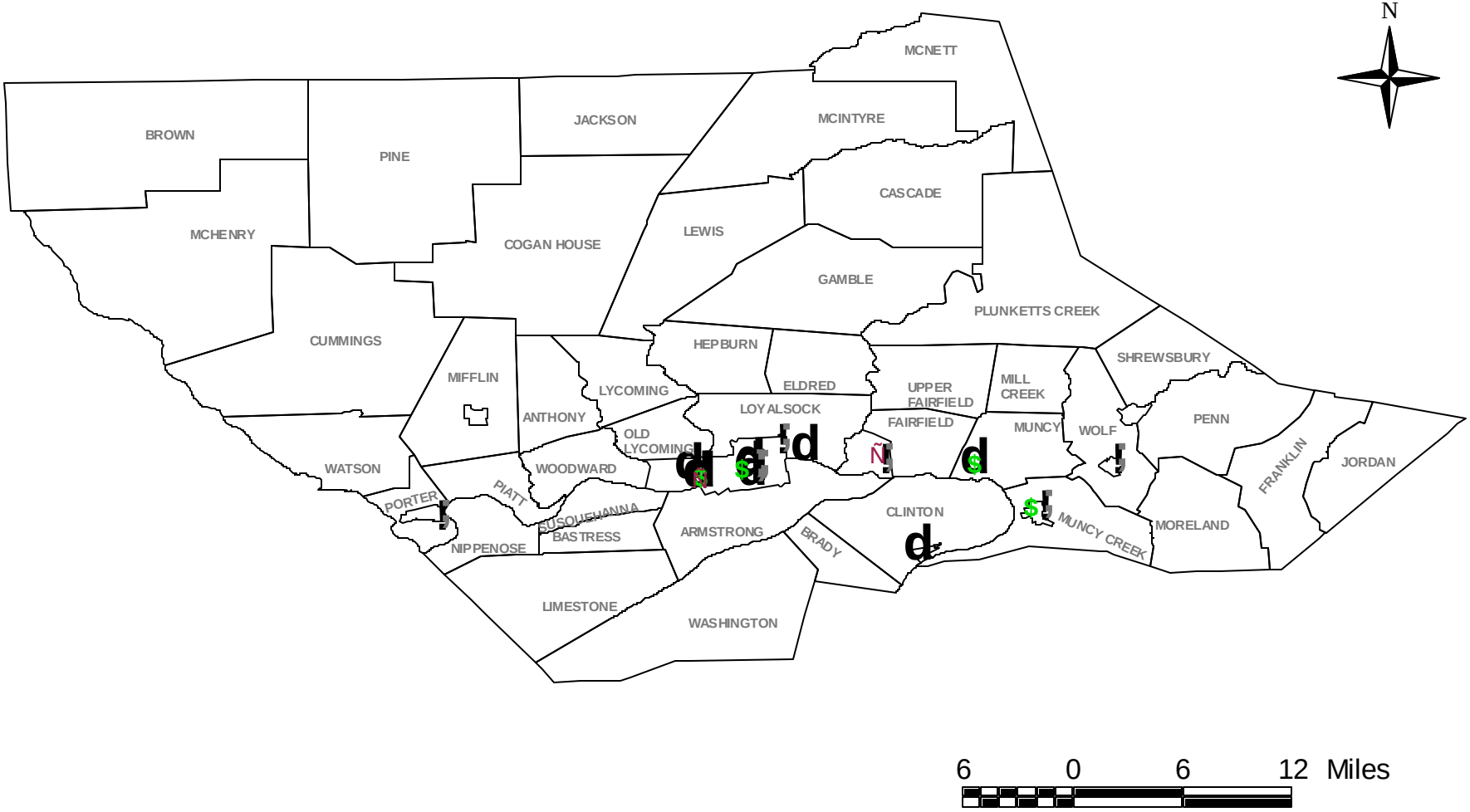

Legend

- Ñ — RCRA TSD
- $ — RCRA Treatment Storage & Disposal
- ¡ — Solid Waste Landfill
- d — RCRA Transporter

LYCOMING COUNTY

PENNSYLVANIA

RCRA TSD & TRANSPORTERS AND SOLID WASTE LANDFILL

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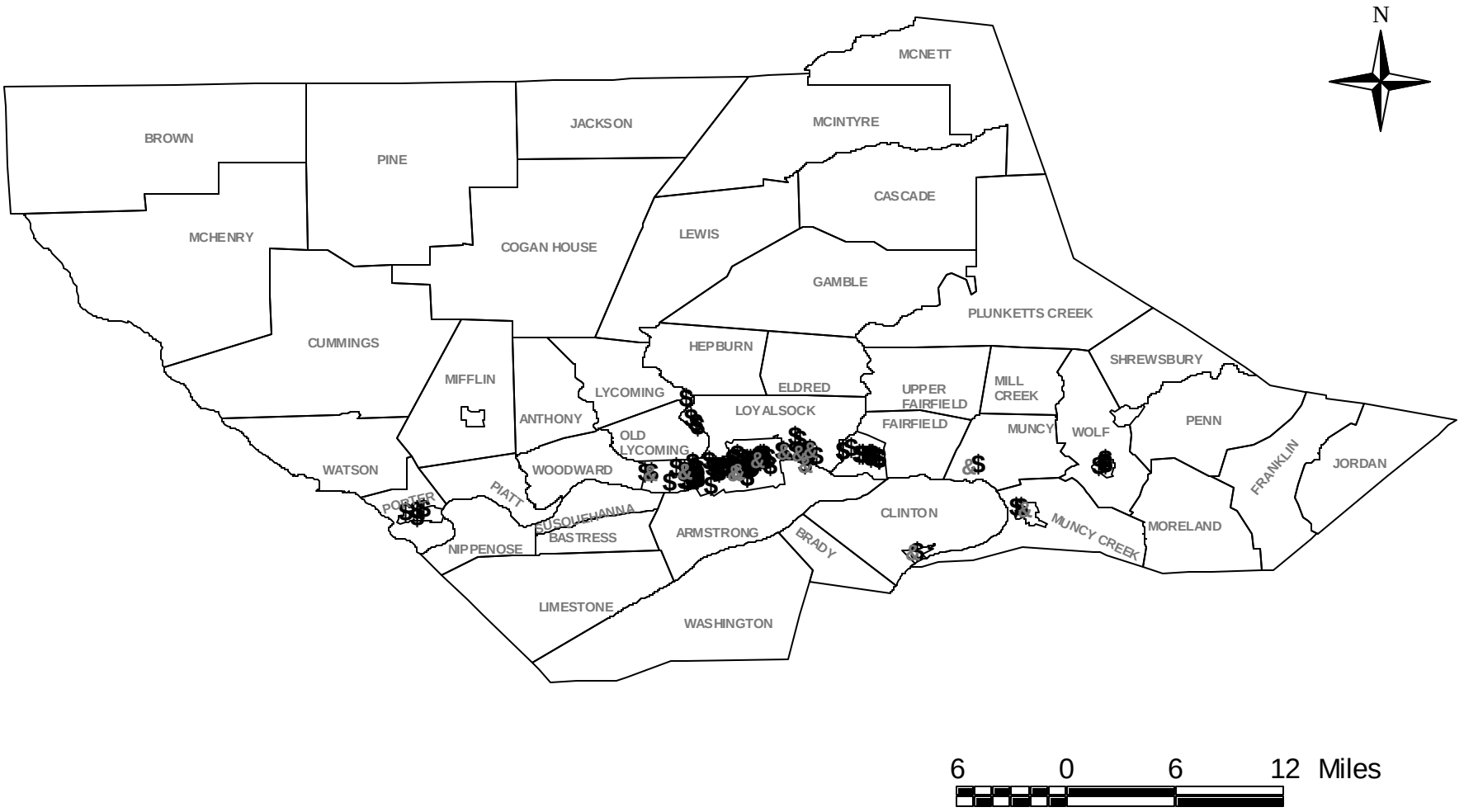

Legend

& RCRA Large Generator

$ RCRA Small Generator

Township Boundaries

LYCOMING COUNTY

PENNSYLVANIA

RCRA GENERATORS

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date 02/02/01	date 4/30/01	date 4/30/01	
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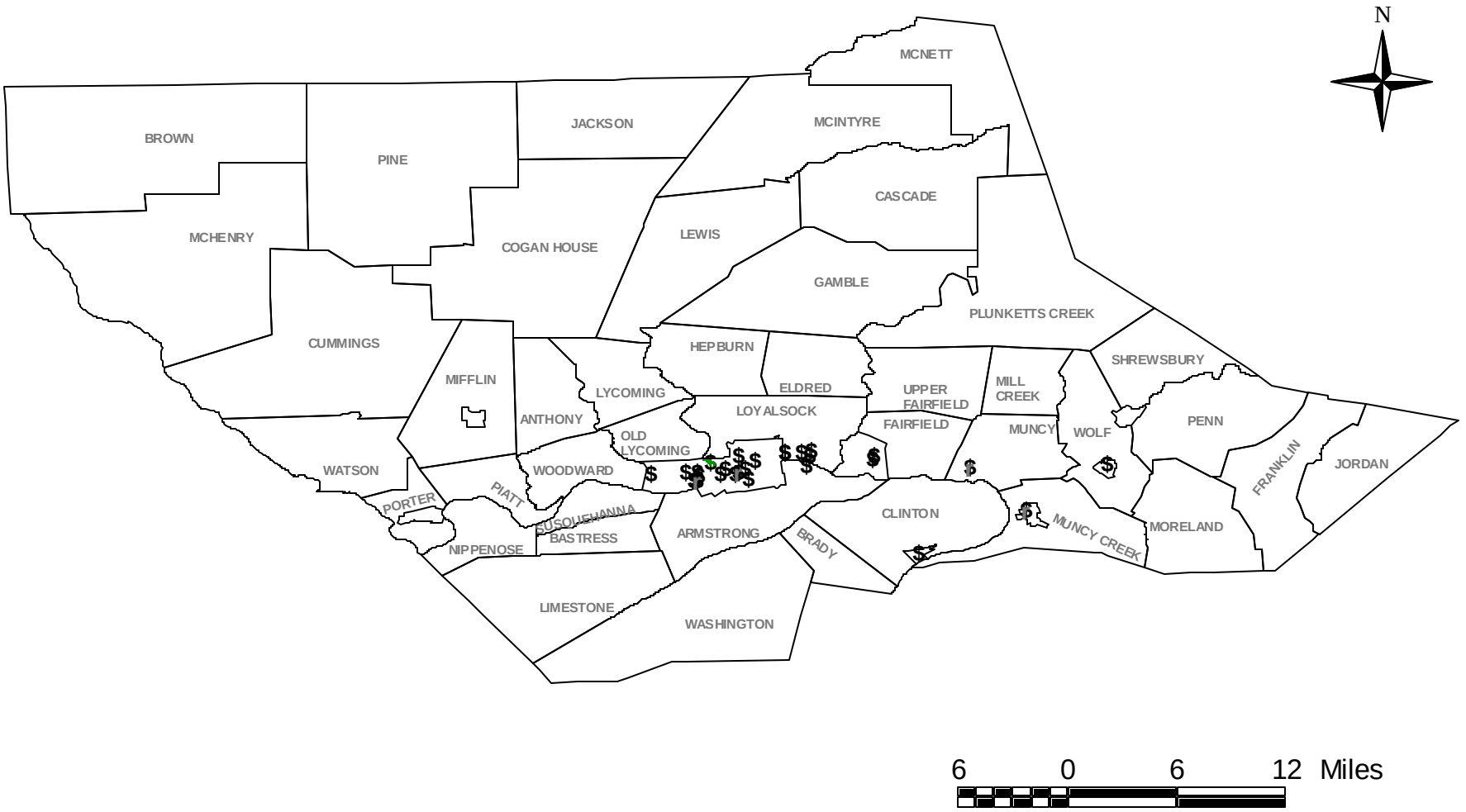

Legend

- National Priority List
- r — RCRA Corrective Action Sites
- $ — RCRA Violators
- Township Boundaries

LYCOMING COUNTY

PENNSYLVANIA

NATIONAL PRIORITY LIST AND RCRA CORRECTIVE ACTION SITES & VIOLATORS

created DEH	checked DEH	approved DDM	figure no. 6-4
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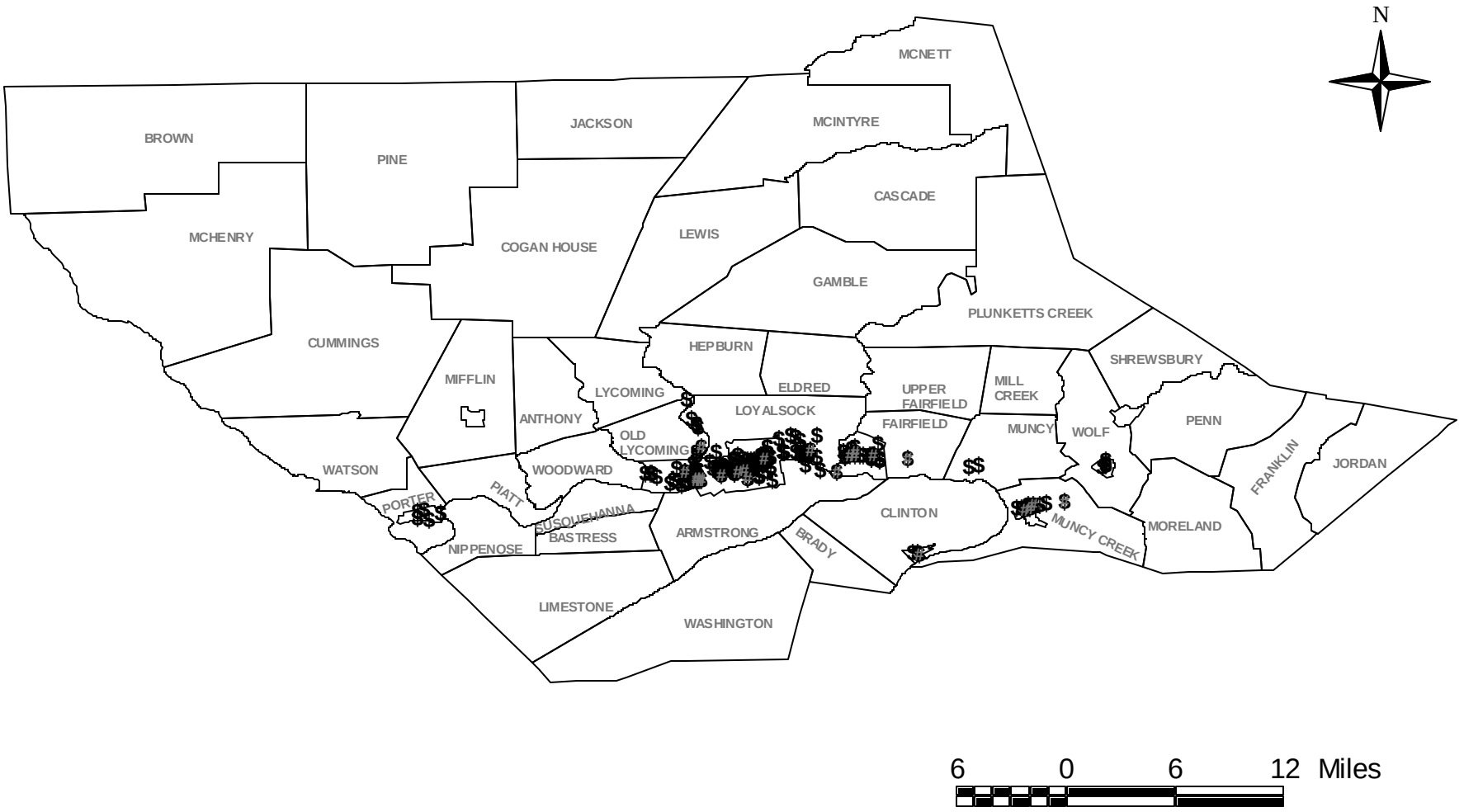

Legend

#	No Further Remedial Action Planned
$	Facility Index System Database
	Township Boundaries

LYCOMING COUNTY

PENNSYLVANIA

NO FURTHER REMEDIAL ACTION PLANNED & FACILITY INDEX SYSTEM DATABASE

created DEH	checked DEH	approved DDM	figure no. 6-5
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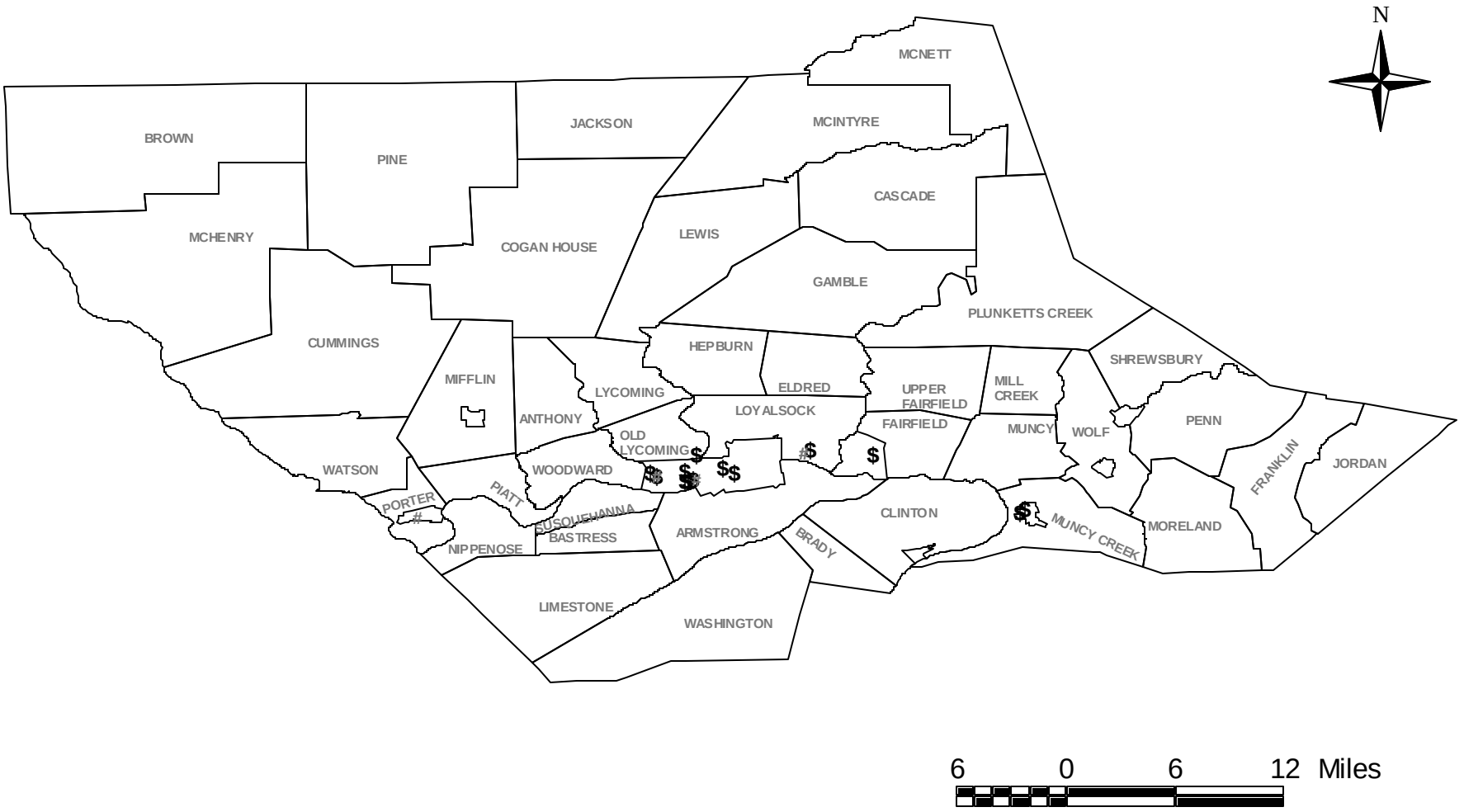

Legend

#	Emergency Response Notification System
$	Toxic Release Inventory System
	Township Boundaries

LYCOMING COUNTY

PENNSYLVANIA

EMERGENCY RESPONSE NOTIFICATION & TOXIC RELEASE INVENTORY SYSTEM

created	checked	approved	figure no.
DEH	DEH	DDM	6-6
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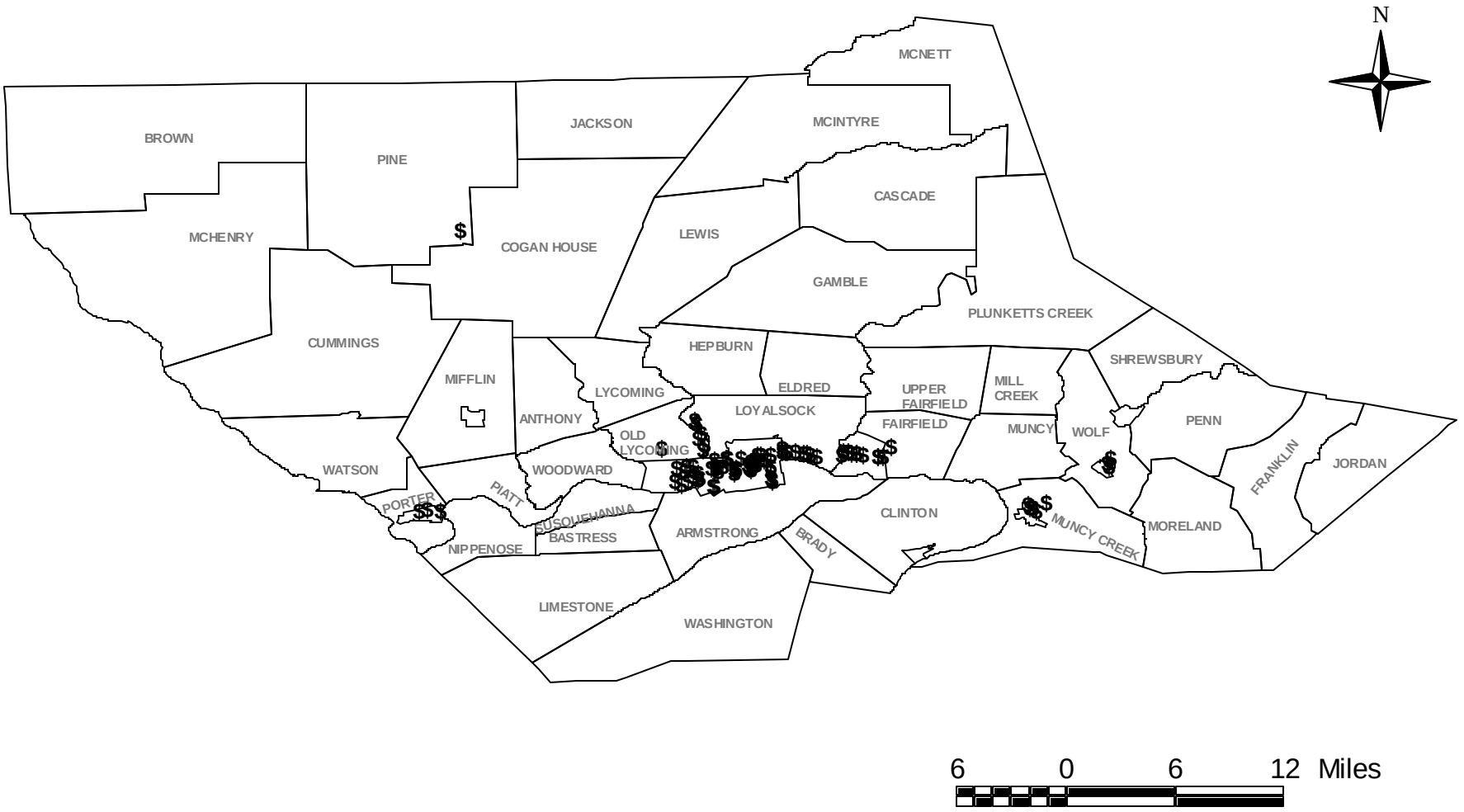

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$ — UST's

Township Boundaries

LYCOMING COUNTY

PENNSYLVANIA

UNDERGROUND STORAGE TANKS

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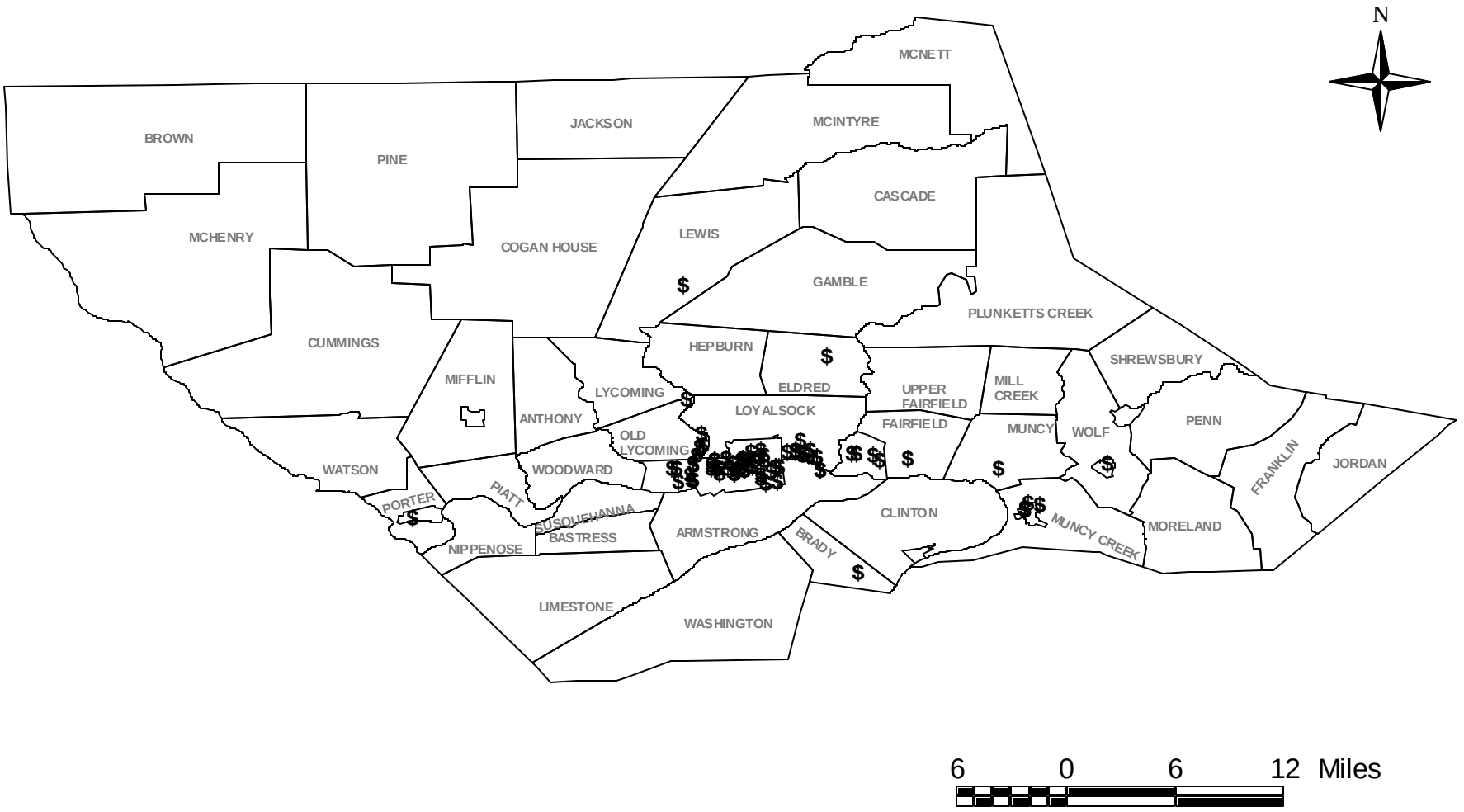

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$ Leaking UST's

Township Boundaries

LYCOMING COUNTY

PENNSYLVANIA

LEAKING UNDERGROUND STORAGE TANKS

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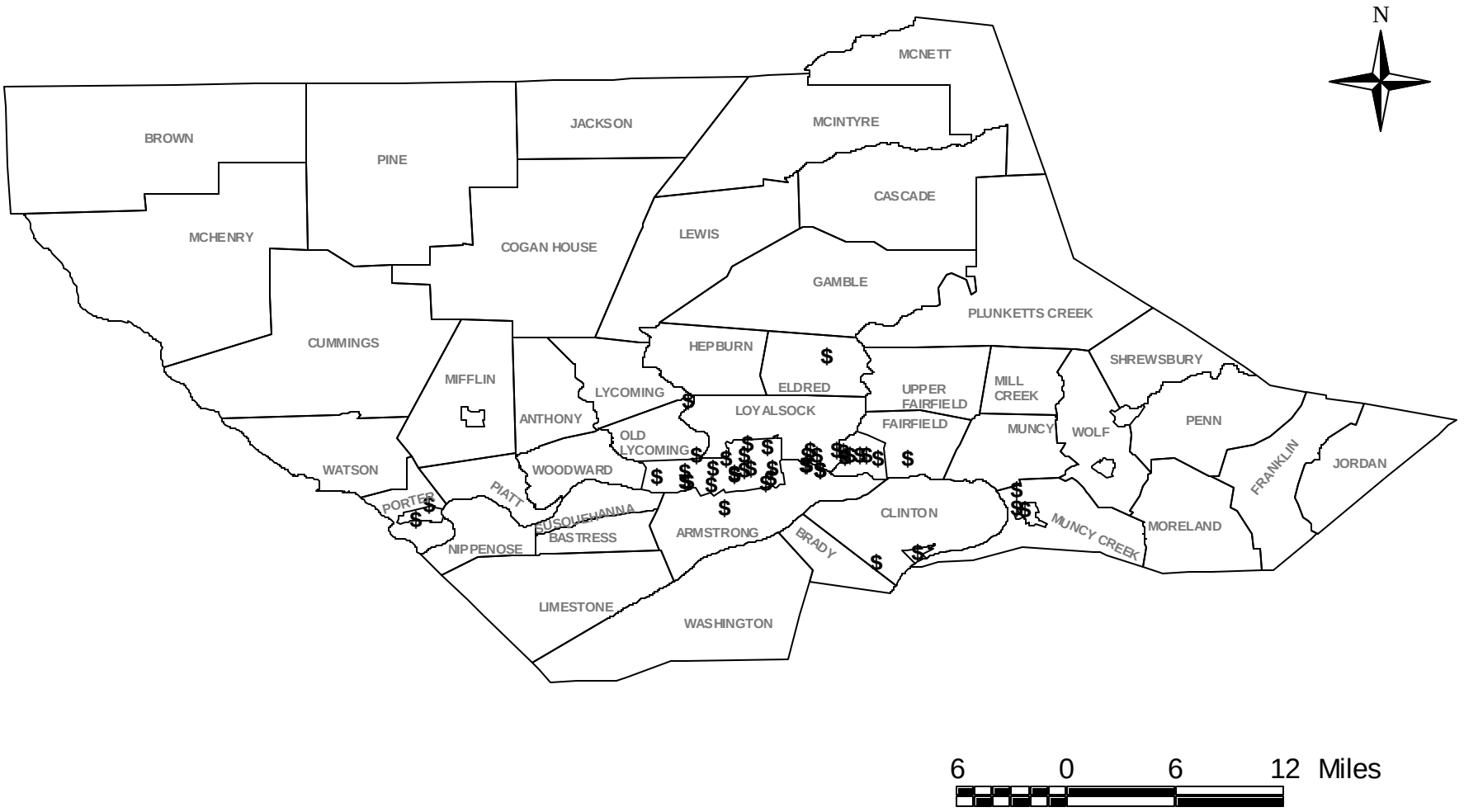

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$ AST's

Township Boundaries

LYCOMING COUNTY

PENNSYLVANIA

ABOVEGROUND STORAGE TANKS

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C

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