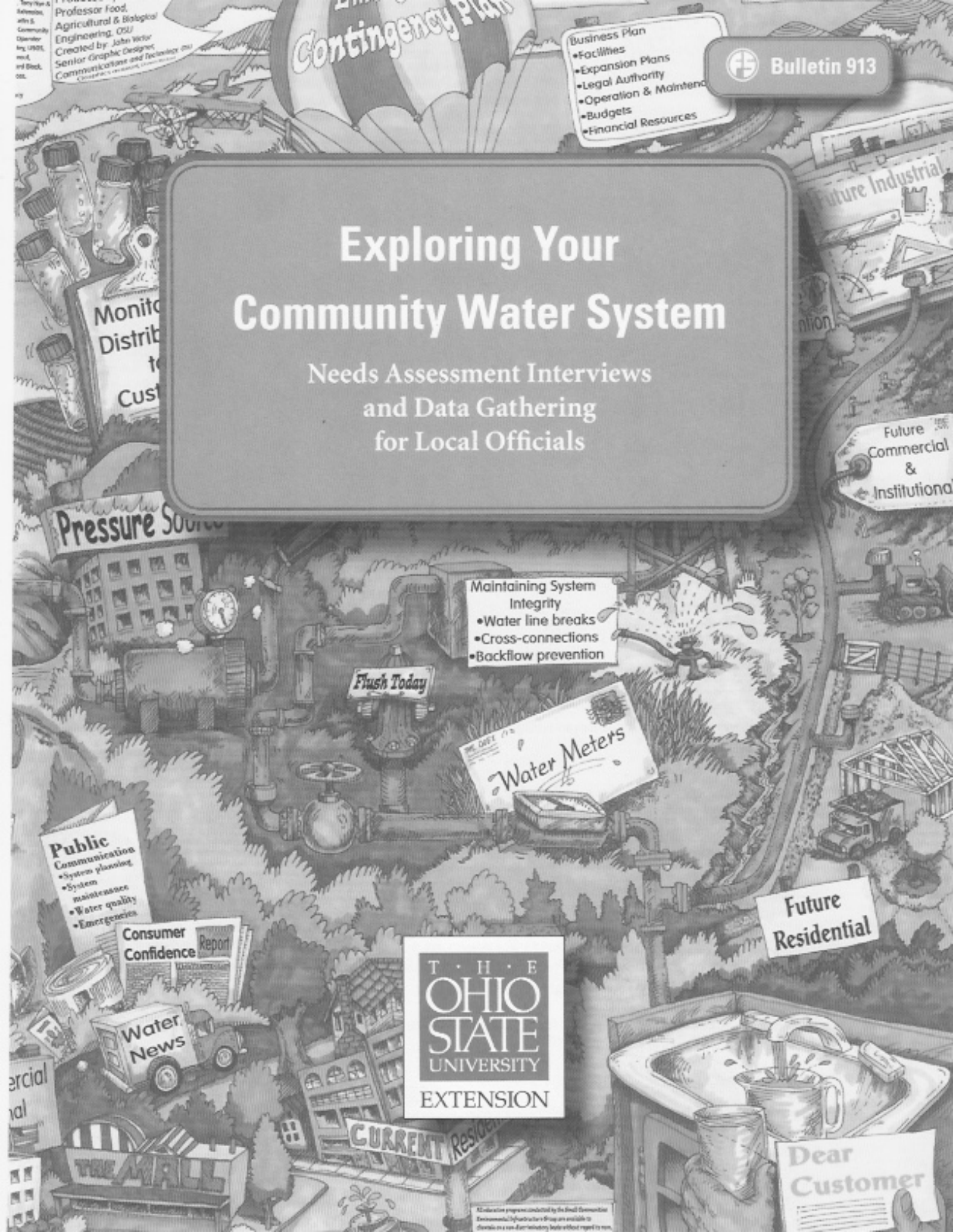
Bulletin 913
Exploring Your
Community Water System
Needs Assessment Interviews
and Data Gathering
for Local Officials
Contingency Plan
Business Plan
•Facilities
•Expansion Plans
•Legal Authority
•Operation & Maintena
•Budgets
•Financial Resources
Future Industrial
Future
Commercial
&
Institutiona
Pressure
Maintaining System
Integrity
•Water line breaks
•Cross-connections
•Backflow prevention
Flush Today
Water Meters
Public
Communication
•System planning
•System
maintenance
•Water quality
•Emergencies
Consumer
Confidence
Report
Water
News
Future
Residential
THE OHIO STATE UNIVERSITY
EXTENSION
CURRENT
THE MALL
Dear
Customer

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Food, Agricultural, and Biological Engineering
The Ohio State University

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For-sale publication

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Introduction

At first glance a water system can appear quite complicated. The physical infrastructure includes the water source, water treatment system, and water distribution system. But a water system also relies on planning, testing, record keeping, communication, personnel management, and leadership.

This workbook presents your community's water system in 35 pieces of one big picture. Your assignment is to visit and talk to people in your community about the water system. The workbook is divided into five sections to organize your visits.

The most important people to include in this dialog are the people who work every day with the water system. Take the sets of questions with you when you visit the water system to talk to the:

- System manager
- Water treatment operator
- Distribution system operator
- Water system owner, board, or authority

To get a complete picture of the water system needs in a community you must also talk to the water system customers:

- Residential customers
- Businesses and institutions
- Industries
- Fire department

Finally, it is important to look for information outside of the community. State agencies, service organizations, technical consultants, and leaders in other communities can give you ideas and insights into how you can continually upgrade the water system in your community.

This bulletin is used in conjunction with Bulletin 910, *Water Systems for Small Communities . . . A Puzzle Guide for Local Officials* and the *Water System Puzzle*, both available for purchase from Ohio county Extension offices. To learn more about water supplies and programs check **http://setll.osu.edu**.

In preparing to gather information on your water system, contact and preferably make appointments with the following people to ask questions about:

Water Treatment System Operator

- Monitoring drinking water for contaminants
- Filtering microbes from drinking water
- Water system disinfection and byproduct control
- Water system operation and maintenance
- Operator certification

Water Distribution Operator (may be the same person as the treatment operator)

- Monitoring drinking water distribution to the customer
- Water distribution system components: pipes, valves, and flush hydrants
- Maintaining water system integrity
- Water system pressure sources
- Lead and copper corrosion control
- Water system operation and maintenance
- Operator certification

Water System Manager

- Source water protection
- Monitoring drinking water sources
- Water testing laboratories
- Water system monitoring, recording, and reporting
- Water storage
- Water meters

- Water system management
- Training for water system personnel
- Financial management for community water system
- Business plan (or capacity assurance plan)
- Water system emergency contingency plan
- Public communication

Water System Owner, Board, or Authority

- Water system ownership and oversight
- Personnel management

Water System Customers

- Does water system meet their needs?
- Removing aesthetic contaminants from drinking water
- Current residential water use
- Current commercial and institutional water use
- Future commercial and industrial water use
- Current industrial water use

Local Insurance Provider

- Fire protection needs

Ohio Department of Development

- Future residential water use
- Future industrial water use

Ohio Department of Natural Resources

- Sources of drinking water

An Experienced Community That Just Completed a Water System Project

- Technical assistance for water systems

For each topic, three or four questions are provided to start the conversation. This interview provides a structure when talking to a number of people about community water system needs. Don't be surprised if people are happy to answer questions and excited to talk to someone who is interested in the community water system.

Questions for the Water Treatment and Distribution System Certified Operators

Monitoring Drinking Water for Contaminants (#23)

Water testing is expensive. Testing requirements are based on the number of customers, the water source, and the history of contaminant detection.

Talk to the water treatment system operator about their water testing requirements.

Questions to Ask

What are the monitoring requirements for this system?

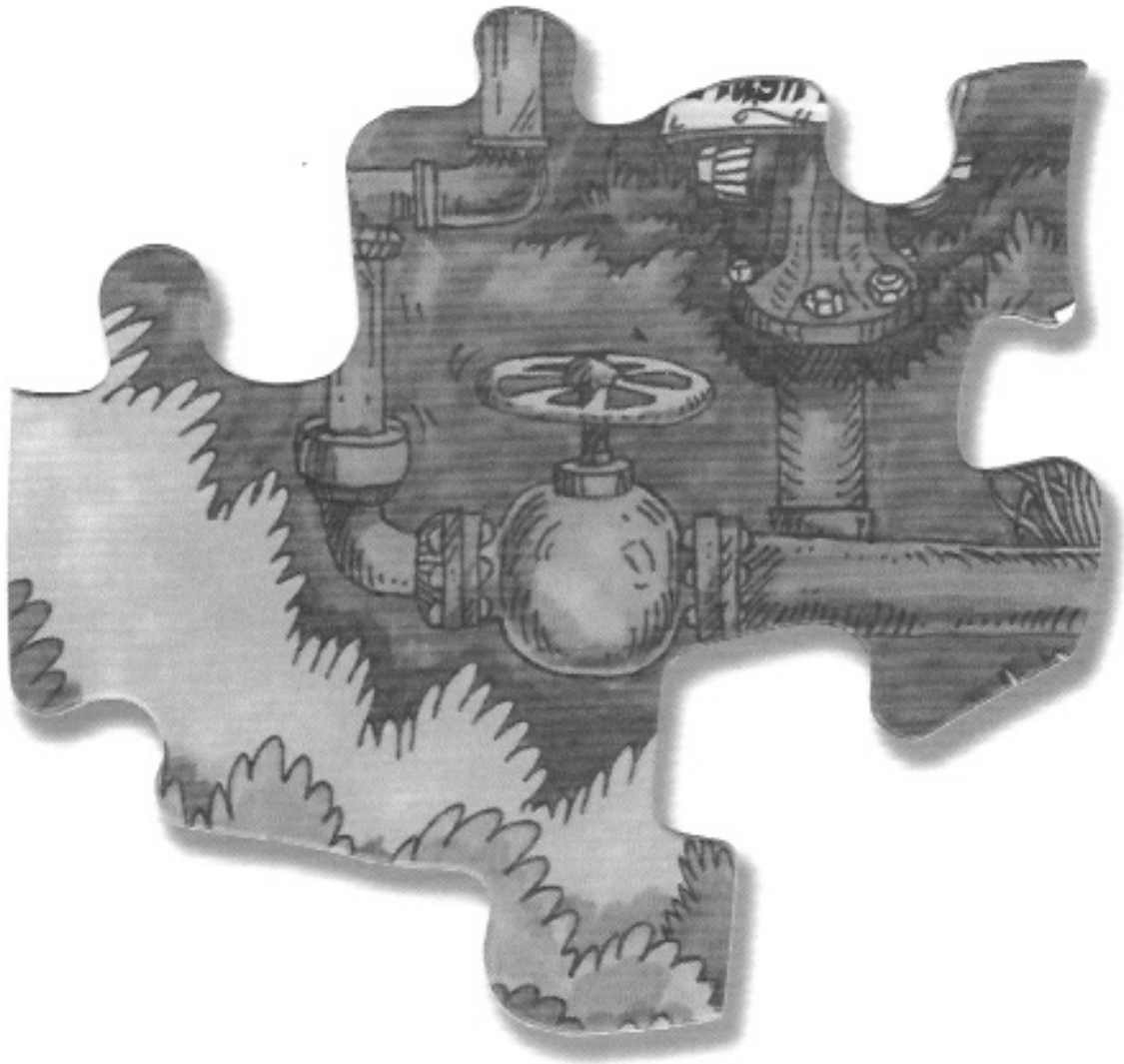
How much does the testing cost?

Can you think of ways testing costs could be reduced?

Water Distribution System . . . Pipes, Valves, and Flush Hydrants (#13)

The distribution system is one of the largest investments made in a water system, but since it is buried in the ground, it is easy to forget about it. Communities also expect water pipes will be used for at least 50 years.

Talk to the distribution system operator about the management of the pipes, valves, and flush hydrants.



Questions to Ask

Where do you keep the map of the distribution system and how often is it updated?

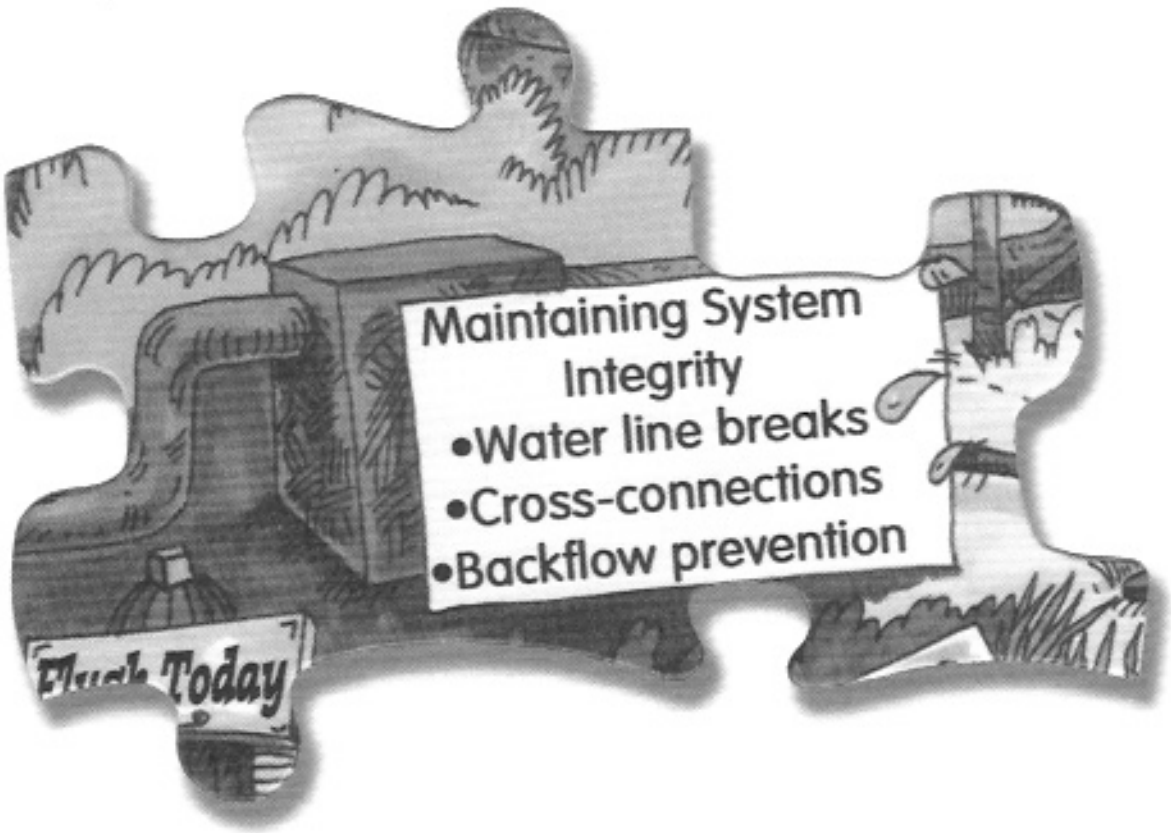
What parts of the system require regular flushing?

How often do the valves need to be exercised?

Maintaining Water System Integrity (#14)

Repairing breaks, flushing the system, and cross-connection control are all a part of maintaining high water quality in the distribution system.

Talk to the water distribution system operator about steps being taken to maintain system integrity.



Questions to Ask

What areas of the distribution system require the most attention?

Do we have a backflow prevention ordinance and is it being adequately enforced?

Who oversees the scheduling of the distribution system maintenance and hydrant flushing?

Water System Pressure Sources (#15)

Pumps at the water plant are the source of water pressure throughout the system. Water systems have options to maintain pressure throughout the system.

Talk to the distribution system operator about water pressure in the system.

Questions to Ask

How is the water pressure maintained in the system and what is the average system pressure?

Does the water system experience water pressure problems in areas of town or during certain times of the day?

If the water service is extended, do you see any problems in providing adequate water pressure?

Lead and Copper Corrosion Control (#21)

Water systems are responsible for providing safe water to customers, even though the source of contamination may be the household plumbing. Talk with the water distribution system operator about their lead and copper control program.

Questions to Ask

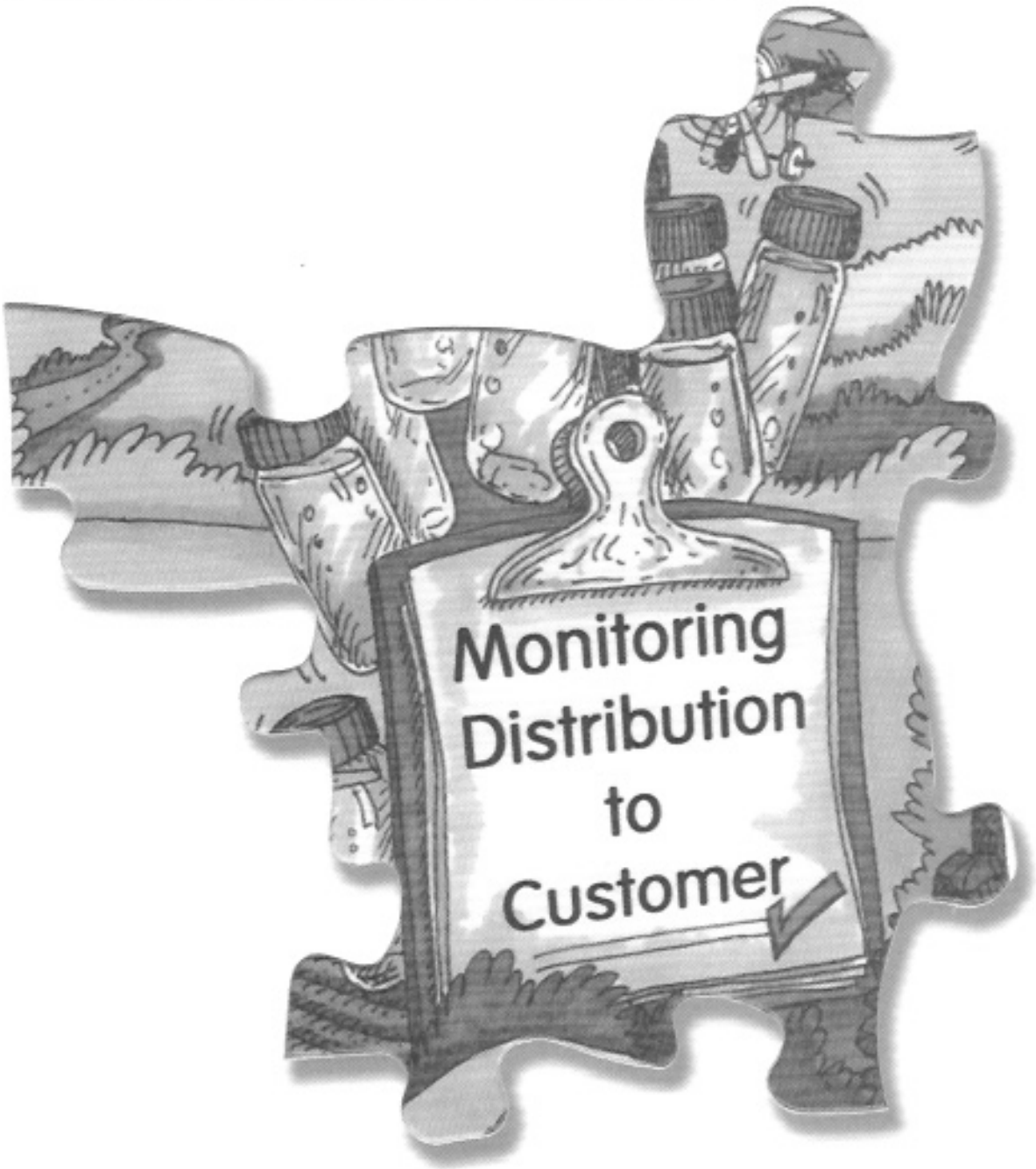
When was the last time this system was monitored for lead and copper?

What are the results of the lead and copper monitoring?

Was a corrosion control system necessary to provide safe water to the customers?

Monitoring Drinking Water Distribution to the Customers (#24)

The quality of water can deteriorate out in the distribution system before it is used by the customer. Talk to the distribution system operator about their monitoring program.



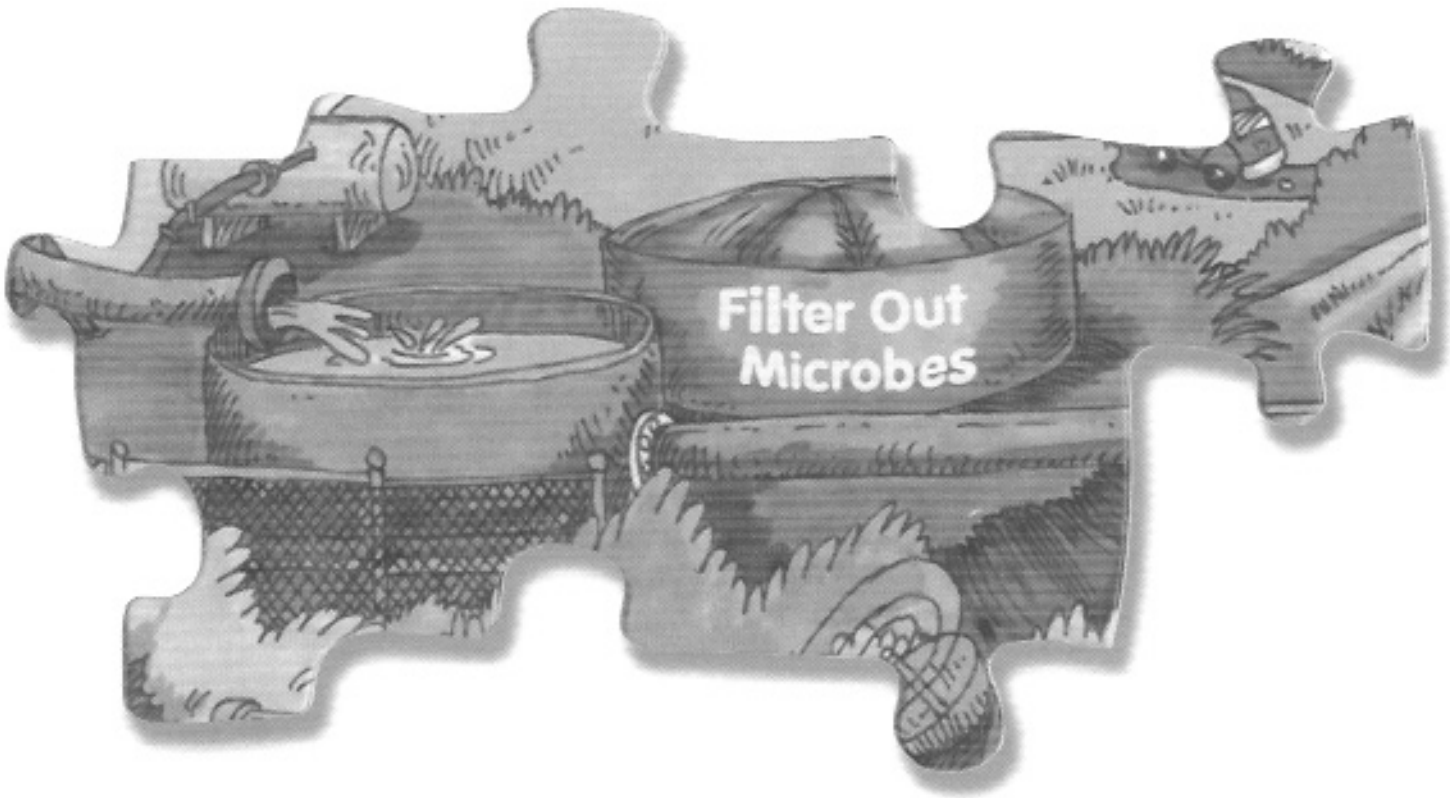
Questions to Ask

Has water loss been calculated for this system?

Does this system have a bacteriological sample siting plan and how often is it updated?

Filtering Microbes from Drinking Water (#19)

Talk to the water treatment system operator about the current filtration system. Remember, in systems using groundwater, the natural soil may be the filter protecting the customers from microbes. Design consultants can help a water system consider other treatment options. Ohio EPA staff offer assistance in evaluating current drinking water filtration systems and can recommend ways to optimize it.



Questions to Ask

What filtration options are available to your community?

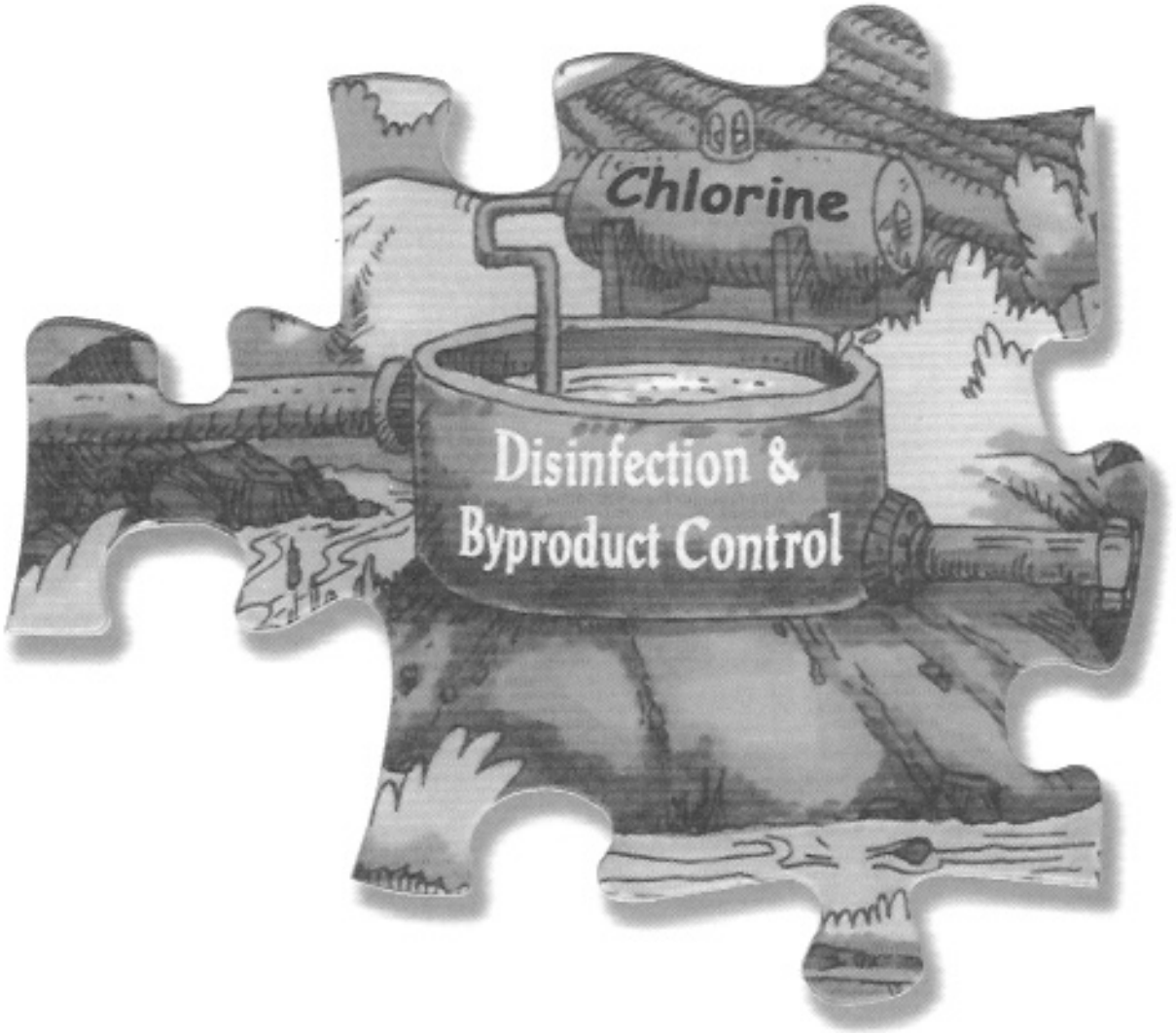
Is your current filtration system adequate to protect the health of the people in your community?

How can your current drinking water filtration system be optimized?

Water System Disinfection and Byproduct Control (#20)

Ideal disinfection systems do not exist. Each approach to disinfection has merits and limitations. Water systems work to balance the merits they want with the limitations they can minimize.

Talk to the water treatment system operator about strategies being used to minimize the limitations of the disinfection systems. Design consultants can help explore new water treatment options.



Questions to Ask

When considering disinfecting water in this water system:

—What are the goals of the disinfection system?

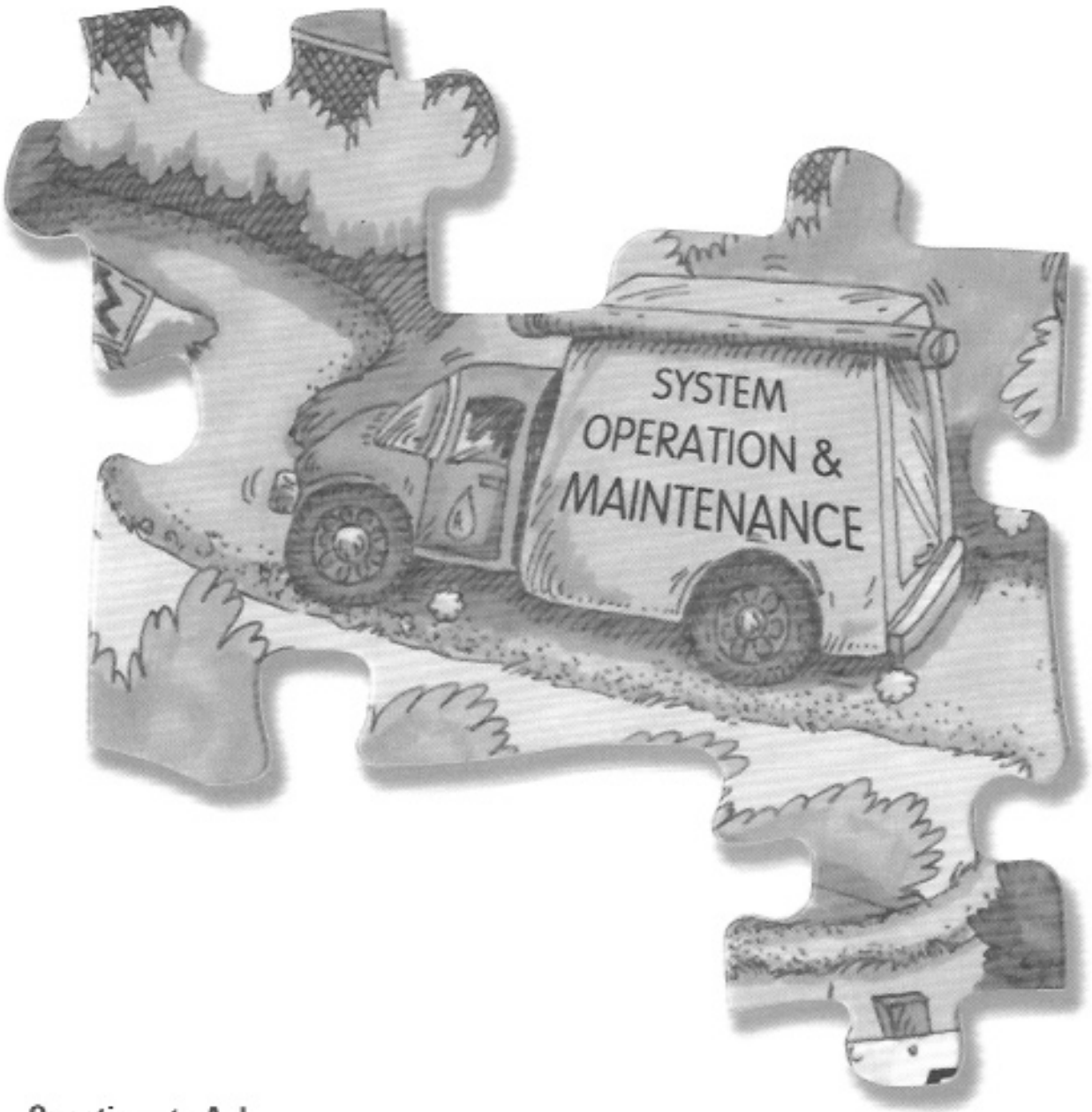
—What limitations of a disinfection system are of greatest concern to you? Why?

—How can you minimize the limitations of this disinfection system?

Water System Operation and Maintenance (#27)

Water system operation involves the day-to-day things the operator does to protect the customer. Maintenance protects the investment in the equipment and facilities.

Talk to both the water treatment operator and the distribution system operator about their operation and maintenance programs.



Questions to Ask

Where do you keep the operation and maintenance manuals and how often are they updated?

Do you have adequate access to spare parts?

What additional resources do you need to keep the system running and looking like it should?

Certified Water System Operators (#28)

Water system operators are tested and certified by the Ohio EPA. Training programs are offered by the Operator Training Committee of Ohio to prepare people to become certified operators.

Talk to both the water treatment operator and the distribution system operator about their level of certification, testing, and training.

Questions to Ask

What are your career goals as a certified operator?

How did you prepare to become a certified operator? How much time did it take?

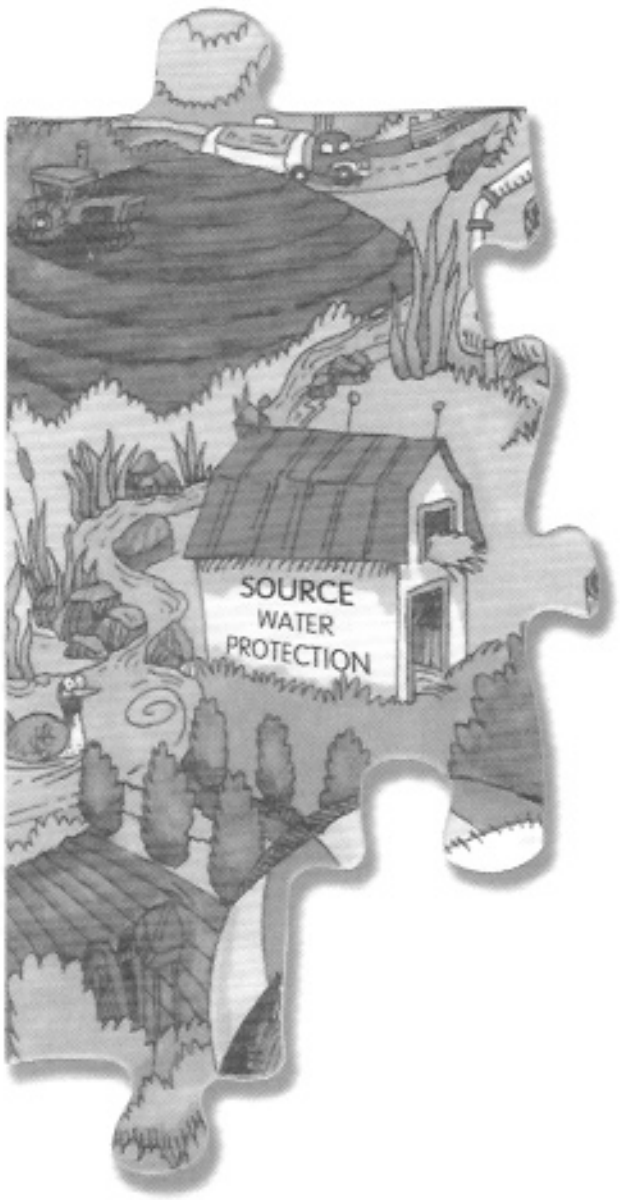
What resources do you need to support continuing education?

Questions for the Water System Manager

Source Water Protection (#12)

Drinking water contaminants are difficult and expensive to remove from drinking water. A single accident can contaminate a water supply for decades. In some unfortunate cases, communities have had to abandon their water supply and develop a new one in response to contamination.

Talk to the water system manager about the progress on the source water protection plan. For more information on delineating a source water protection area, developing potential contaminant source inventories, and strategies to better protect a water source, contact the Ohio Environmental Protection Agency Division of Drinking and Groundwater.



Questions to Ask

Has the source water protection area been delineated?

What is currently on the potential contaminant source inventory?

Are any programs currently in place to protect our source water?

Monitoring Drinking Water Sources (#22)

While usually not required, monitoring a drinking water source is one tool an operator uses to improve the efficiency of a system. Talk with the water system manager about any source water monitoring they choose to conduct.

Questions to Ask

Is any source water monitoring required by law?

What source water monitoring would benefit plant operations?

What additional information and resources would be needed to conduct source water monitoring?

Water Testing Laboratories (#25)

Ohio EPA maintains a list of certified water testing labs that is updated quarterly. The list is posted on the following website: **www.epa.state.oh.us/ddagw/pubs.html#certlabs.**

Talk to the water system manager about their water testing program and the certified lab they use.

Questions to Ask

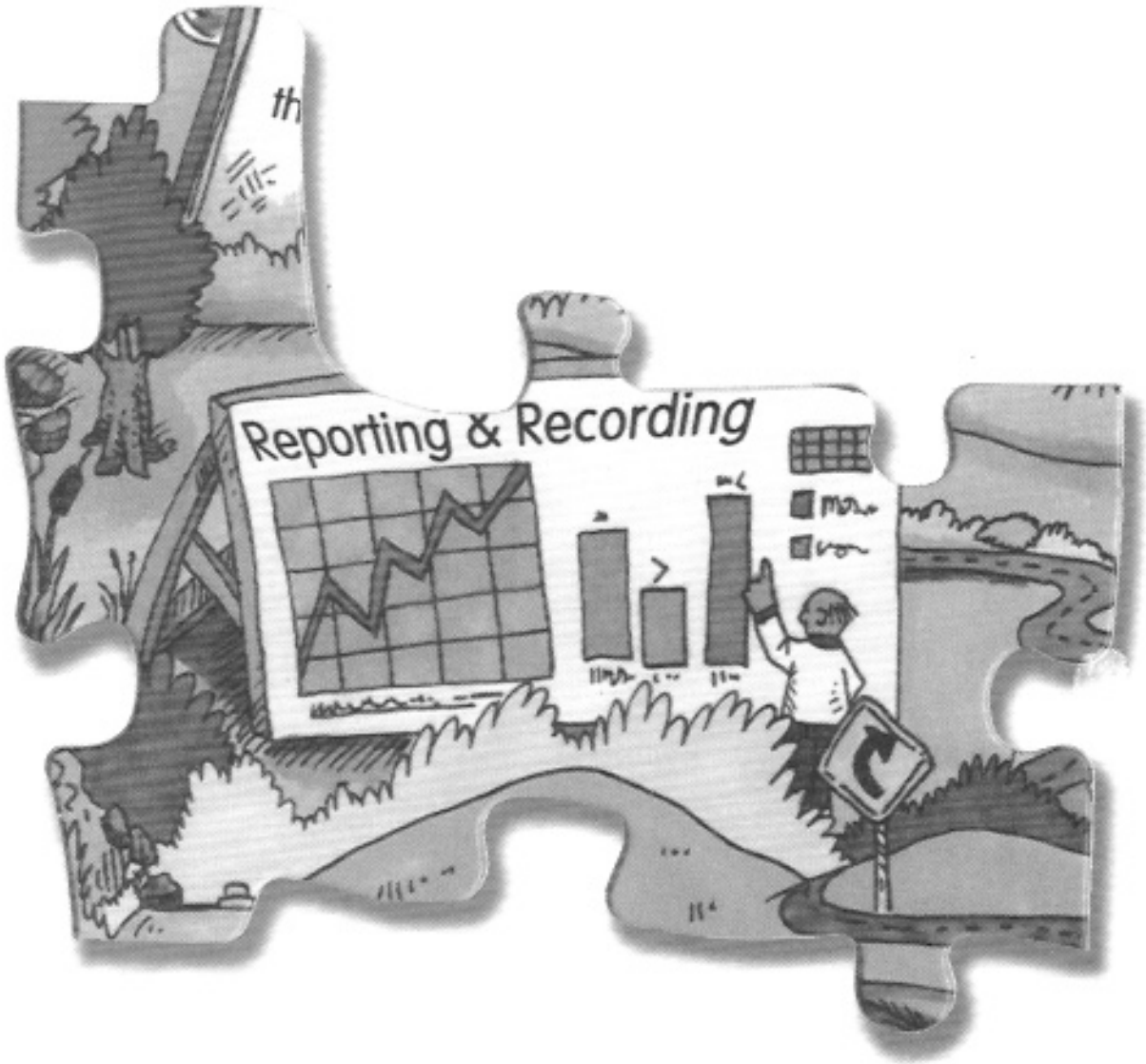
Where is water testing currently done?

Do you have other options to meet water testing requirements?

Do you have any ideas of ways that lab work can be done more effectively?

Water System Monitoring: Recording and Reporting (#26)

Any facility that produces a product and supplies it to customers must keep track of its operation. Talk with the water system manager about their records and reporting system.



Questions to Ask

Who looks at your monitoring reports?

How often do you have to report to the Ohio EPA?

Do you keep monitoring results on a computer?

Water Storage (#16)

Water storage tanks accumulate water throughout the day to meet peak demand. Talk with the water system manager about further enhancing water storage.

Questions to Ask

How many hours of water storage are available?

—Total volume of water storage:

—Gallons per hour at peak demand:

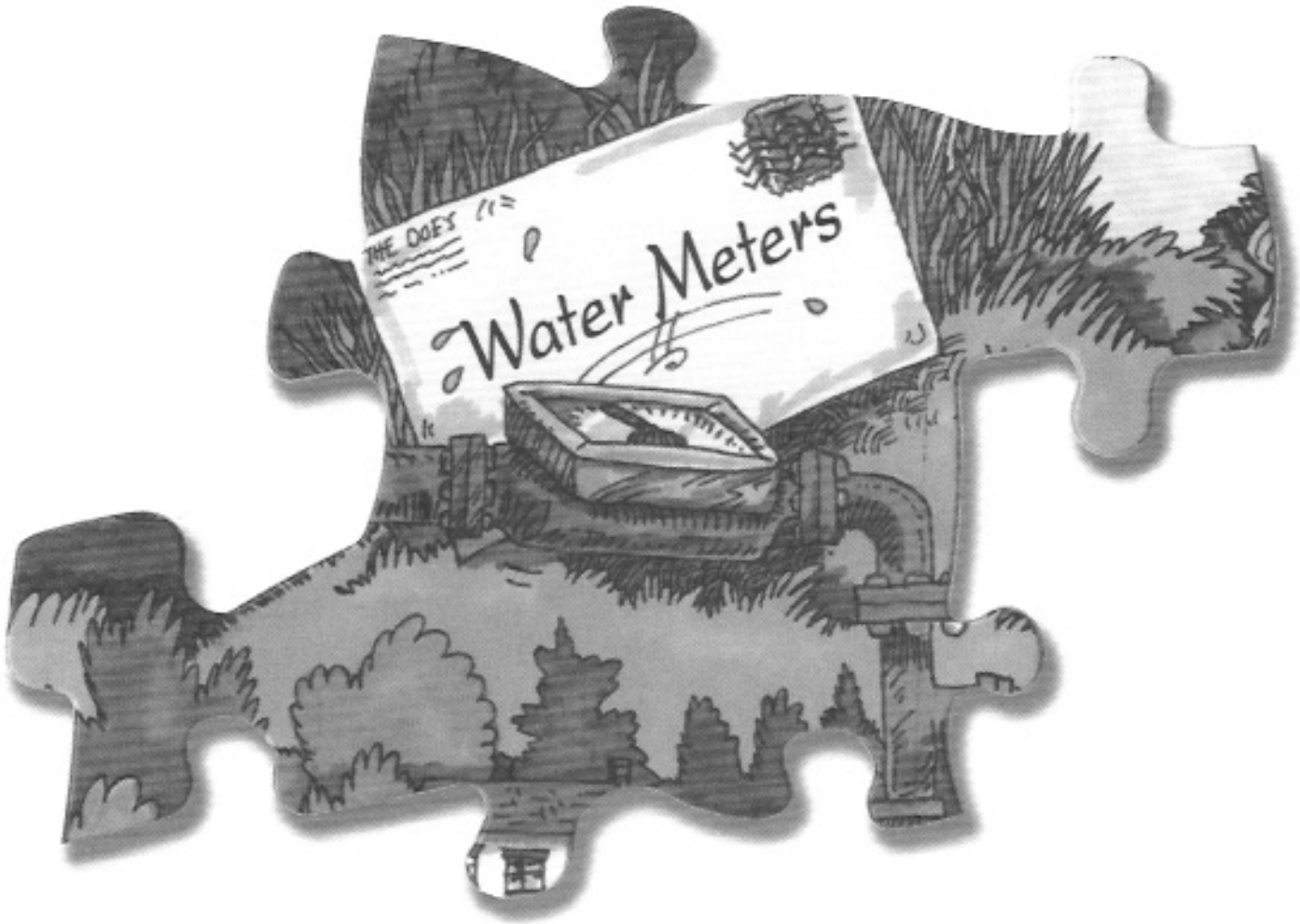
What would happen to the water in storage in the event of a fire in the community?

—Estimate of gallons per hour in the event of a fire:

What areas of the community will require additional storage to meet increasing demand?

Water Meters (#17)

Water meters are the cash register for the water system and the meter reader may be the only person from the water system that the customer is likely to meet. Talk with the water system manager about their meter reading program.



Questions to Ask

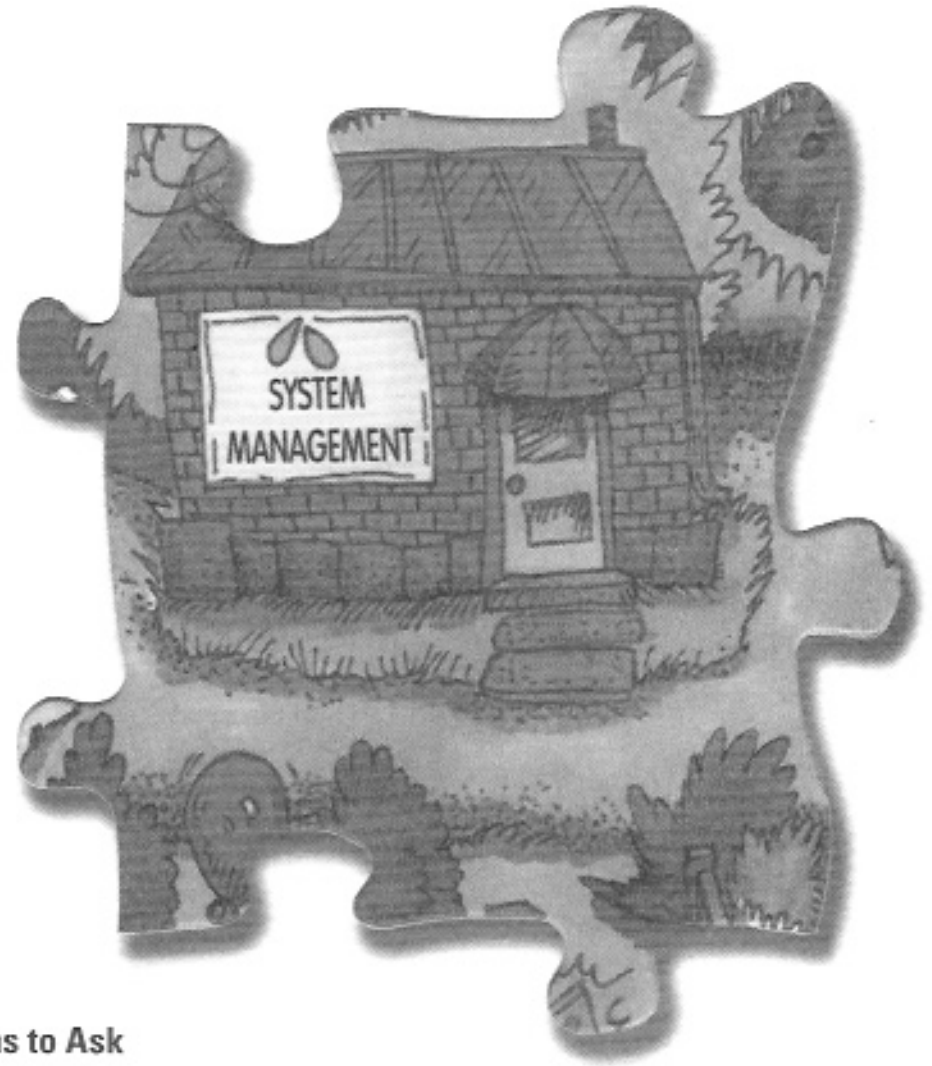
Are obstacles preventing routine reading of meters?

Are meter readings revealing water distribution concerns such as leaks?

How are meter readers representing the water system to the customer?

Water System Management (#29)

Personnel administration, fiscal responsibility, public relations, liability control and insurance, along with working with local and state governments, are all a part of water system management. Talk with the water system manager about further enhancing the water system.



Questions to Ask

Who is responsible for important water system issues?

—Personnel administration

—Fiscal management

—Public relations

—Reporting to board or authority

—System operations

—System maintenance

—Liability control and insurance

—Government relations

—Expansion/updates/improvements

What resources are needed to further enhance the management of the water system?

What management training do you participate in?

Training for Water System Personnel (#31)

Continuing education is required for certified water system operators. Talk with the water system manager about providing for training.

Questions to Ask

What level of certification does your system require?

Where can you and your staff get the required training?

What other training opportunities would benefit the staff, help retain them, and better serve the customers?

What is the current training budget and is it adequate?

Financial Management of Community Water Systems (#35)

Successful financial management balances the funding necessary to provide a safe, reliable water supply with what the user can afford. The customer pays for the development and operation of the water system. If money is borrowed to improve or extend water service, a plan must be in place to assess system users to pay back these obligations.

Talk to the water system clerk and the system manager about budget and rate setting. The Ohio Rural Water Association may be able to assist small systems in conducting a water audit and rate study.

Questions to Ask

How is the annual budget developed?

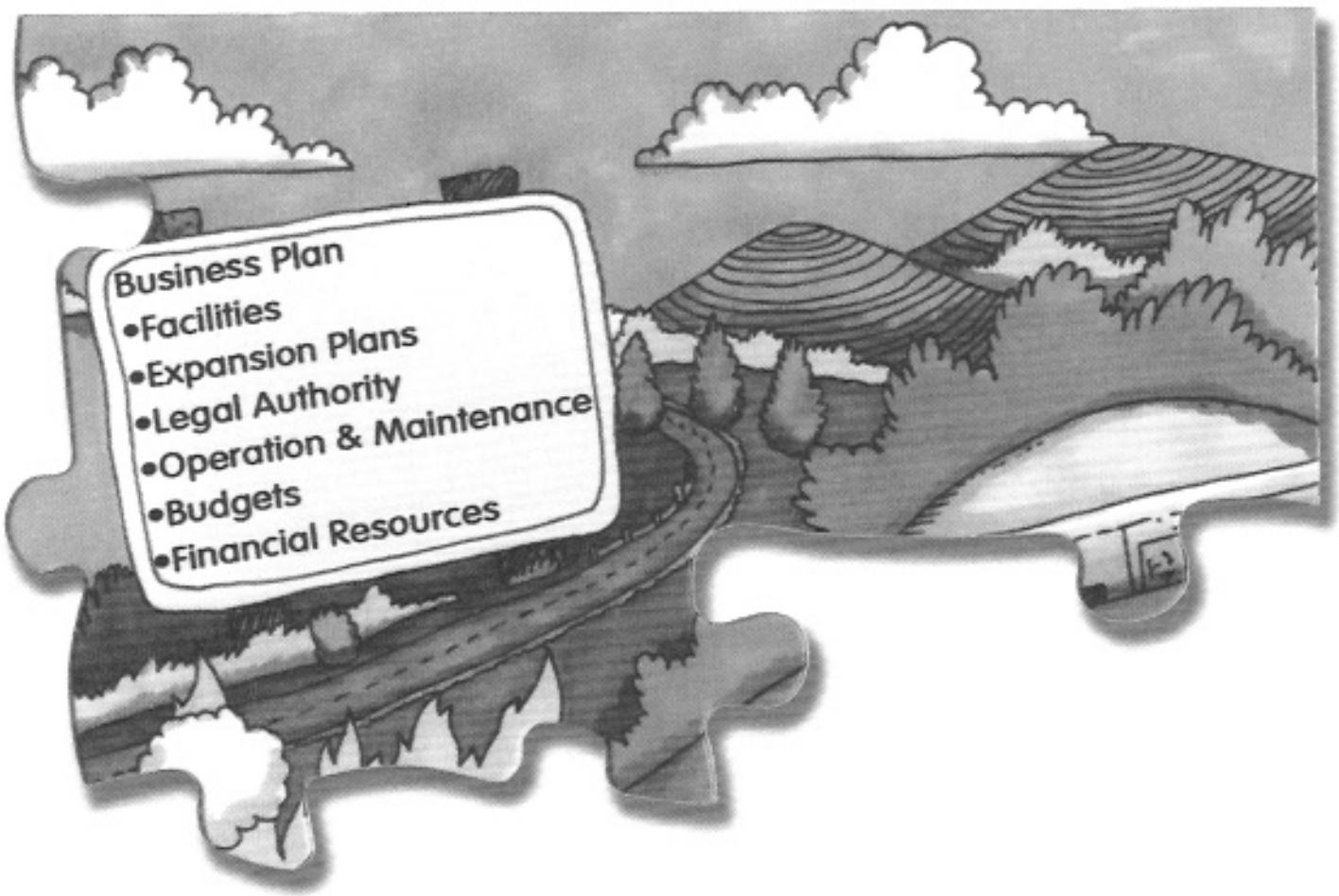
How is the amount of money set aside for future improvements and emergencies determined?

When was the last water audit and rate study conducted?

Business Plan (#33) or Capacity Assurance Plan

A water system produces a product, has customers, collects revenue, and has employees like any business. Therefore, it should have a business plan.

Talk to the water system manager about the development of the business plan, also known as a capacity assurance plan. If some parts are missing, contact the Great Lakes Rural Community Assistance Program for help in how to enhance the plan.



Questions to Ask

In putting the business plan together, are any pieces missing?

Who is involved in generating alternatives and plans for expansion as a part of the general plan?

How are alternatives selected?

Water System Emergency Contingency Plan (#34)

The best emergency contingency plan is one that is never put into practice. By thinking through all likely emergency situations, a water system may be able to avoid most emergency situations and be prepared to help neighboring communities.

Talk with the water system manager about their emergency contingency plan.

Questions to Ask

Where is the emergency contingency plan filed and when was it last updated?

What emergencies do you feel are the most likely to occur in this community?

What resources do you plan to access in an emergency?

How would you communicate with customers in an emergency?

What steps are being taken to prevent emergencies?

What actions have been taken to support homeland security?

Public Communication (#37)

Public communication is essential and beneficial in system planning, system maintenance, drinking water quality, and emergencies. Consumer Confidence Reports, while a legal requirement, if properly done, can help build support for the public water system.

Talk to the water system manager about communication with the public. You may want to form a customer advisory committee to suggest ways to improve communication. To find out more about Consumer Confidence Reports and emergency communication requirements check the Ohio Environmental Protection Agency website at **www.epa.state.oh.us/ddagw/ccr.html** or contact the American Water Works Association (AWWA) at 800-366-0107.

Questions to Ask

How often do you hear from the water system customers?

How do you communicate with customers now?

—In an emergency?

—When maintenance is performed?

—When improvements are planned?

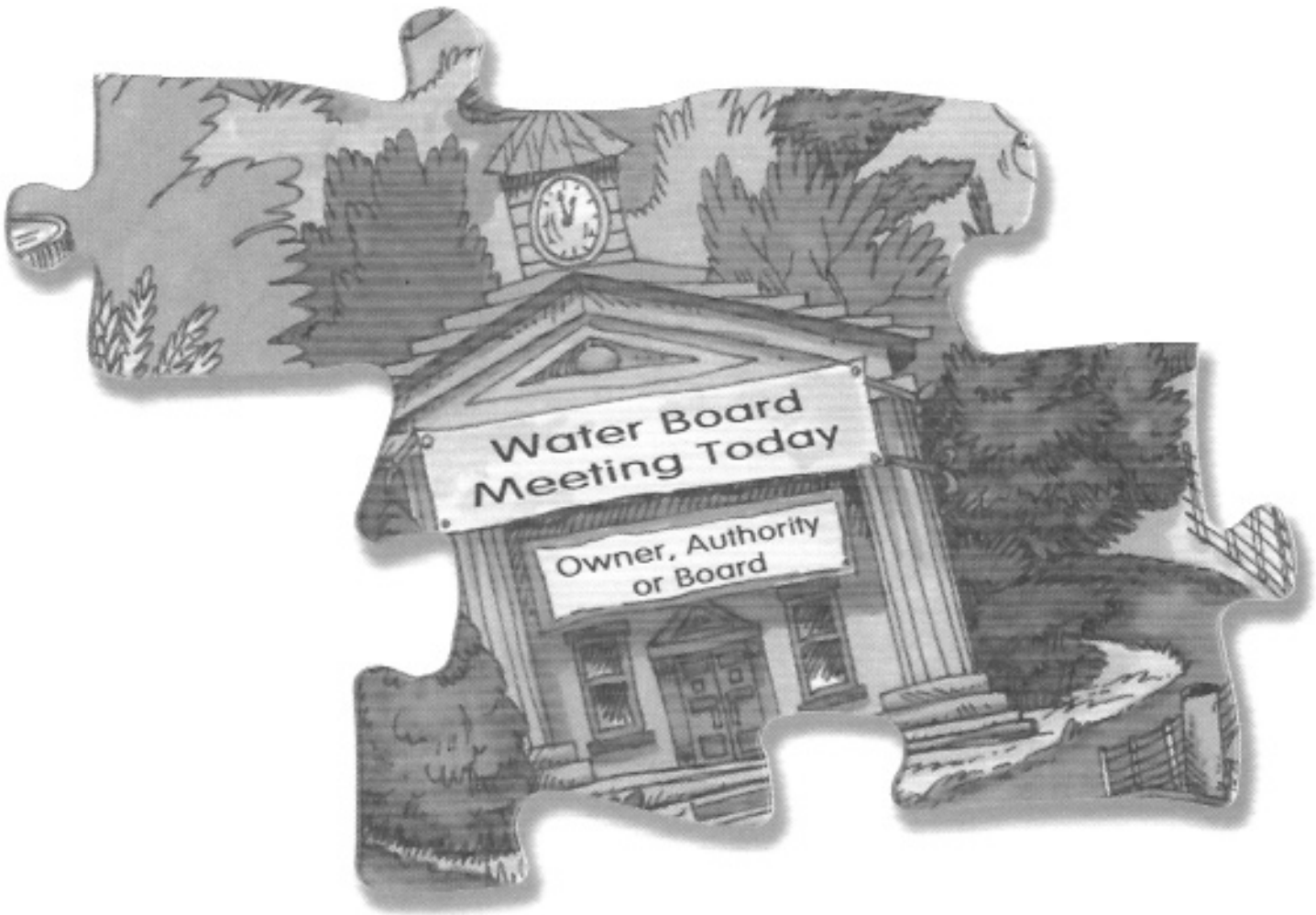
—About water quality?

Can you suggest ways to improve communication between the water system personnel and the customers?

Questions for the Water System Owner, Board, or Authority

Water System Authority, Board, or Owner (#32)

Discuss the ownership and oversight of the water system with a diverse group of people. Local elected officials, the water system manager, and the water system authority, board, or owner are just some of the people that may have strong feelings about the community's water service.



Questions to Ask

Describe the management structure of the water system as you understand it.

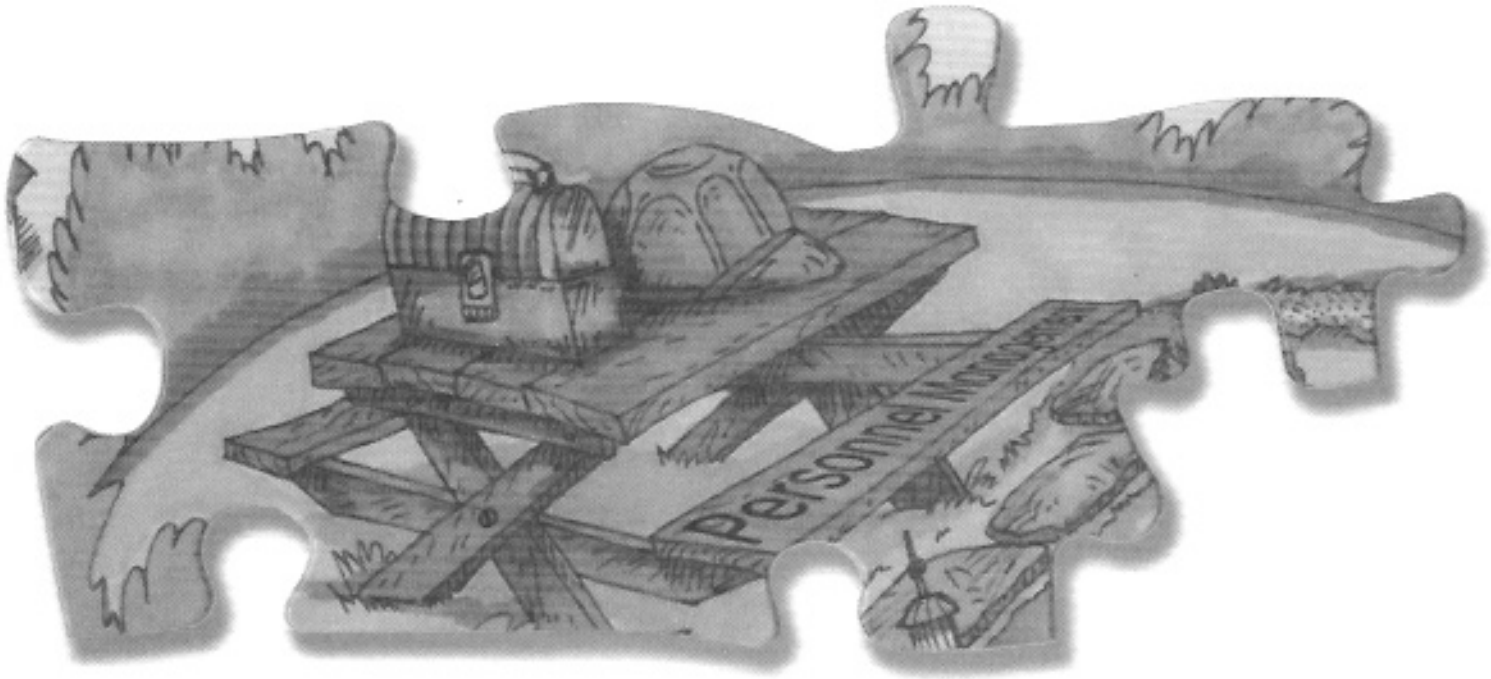
What current issues is the water system facing? Is it difficult to address any of these issues under the current management structure?

What changes could be made to streamline the management of the water system?

Personnel Management (#30)

A range of knowledge and skills are needed to run a public water supply. Seldom can one person do the entire job. Respect and appreciation by the water system authority for the employees and the important jobs they do should be evident to the customers. Leadership and employee pride contribute to customer confidence and satisfaction.

Talk to the water system authority or governing board about personnel management issues.



Questions to Ask

Where do you keep the water system position descriptions and who was involved in developing them?

Who has a copy of the policy and procedures handbook and how often is it reviewed and updated?

How often do you conduct evaluations of staff?

Where do you conduct weekly staff meetings?

Questions for the Water System Customers

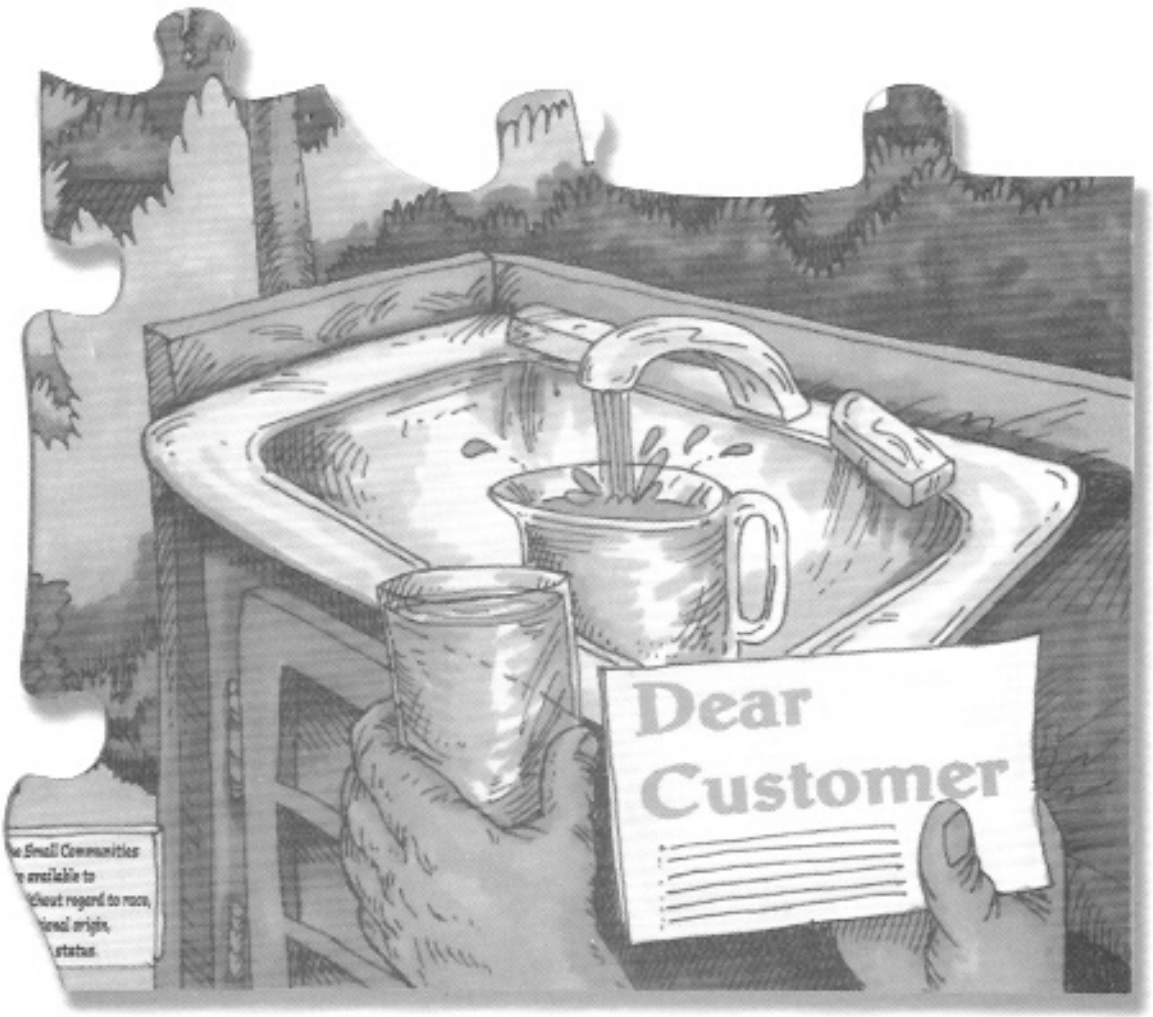
—Residential
—Businesses
—Institutions
—Industries
—Fire Department

Water System Customers (#3)

Water system customers expect a reliable water supply that is safe and pleasant to use.

If homes in your community are served by *private wells*, begin by testing the water in your own home. Information on water testing is available from local county Extension offices. Ask for fact sheets AEX 314 and AEX 315 for how and where to have your water tested. Talk to neighbors and ask them when they last had their water tested. Check with the schools, churches, restaurants, and other businesses in the area about their drinking water tests.

If your community is served by a *community water system*, ask the operator for the latest copy of the consumer confidence report. Ask neighbors if they like their drinking water. Ask if they have their own water softeners or other home water treatment equipment.



Questions to Ask

Is the drinking water serving citizens in your town free of pathogens?

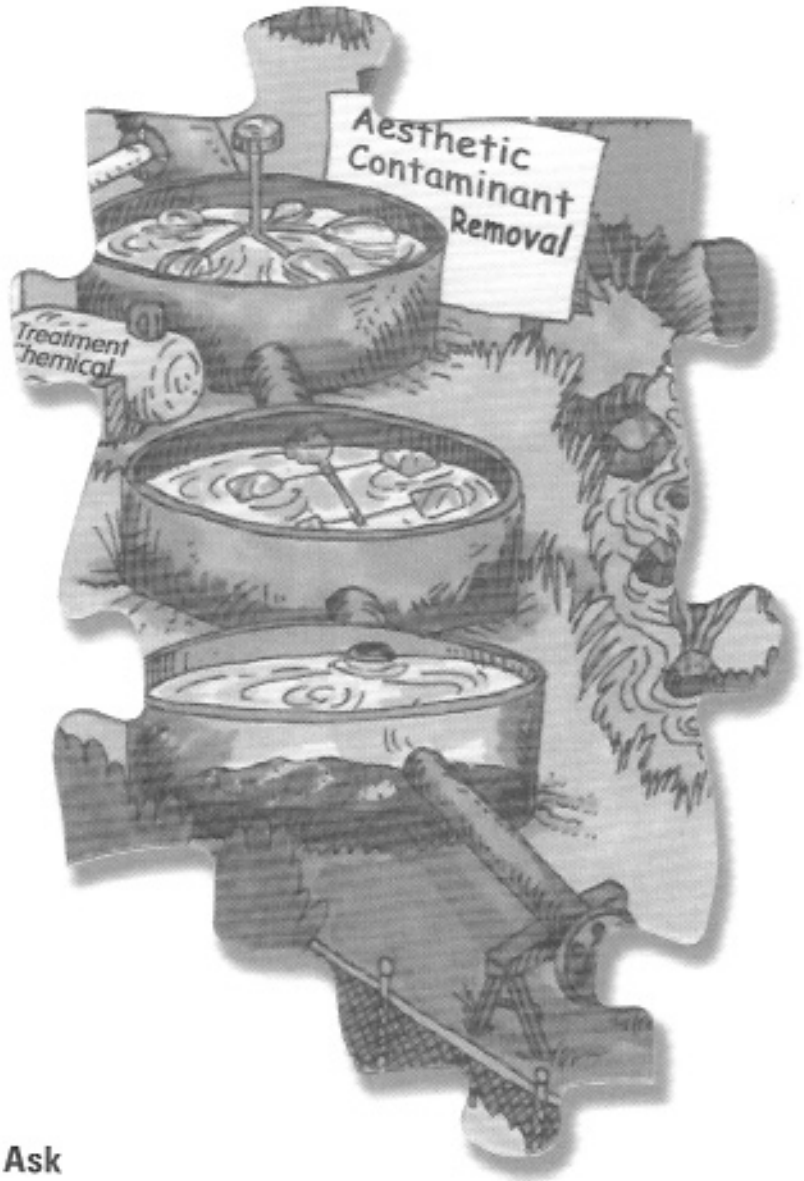
Does the drinking water serving citizens in your town contain any toxic substances?

Does the drinking water serving citizens in your town smell bad, stain clothing, corrode plumbing, or is it hard?

Removing Aesthetic Contaminants from Drinking Water (#18)

Community water systems in Ohio are *required* to remove iron and manganese from drinking water where present. Some public water systems *may choose to* remove other aesthetic contaminants, making the water more pleasant to use and saving the customers the trouble and expense of treating their water in their home or purchasing bottled water.

Ask at least ten customers in different areas of town about their drinking water. For more information on the quality of different water sources, contact Ohio EPA staff in the office of Drinking and Groundwater. Design consultants can help work through treatment options.



Questions to Ask

What do you think about the taste, odor, and color of the drinking water for your home?

Do you have problems with hard water or staining of fixtures?

How much are you spending on household water treatment and/or bottled water?

Current Residential Water Use (#4)

Look around the community to see how people landscape their lawns. High household water use is often linked to lawn watering.

The age of homes also gives an indication of current water use. Since toilet flushing uses the greatest amount of household water, the low flush toilets required in new homes can reduce water use. This applies to all homes built since 1990.

Questions to Ask

How many people live in dwellings served by your water system?

How much water would you estimate they use? (number of people X 75 gallons per person = residential water use)

How do people use water in your community?

—To water lawns?

—For swimming pools?

—For whirlpool bathtubs?

What percentage of homes in your community use low flush toilets?

Current Commercial and Institutional Water Use (#5)

Talk with each business owner and institutional director about their current water use, water needs, and how they envision water needs changing in the future.

Finally, check with the water system clerk to make sure that all water users, especially government buildings, are being billed for the water they use.

Questions to Ask

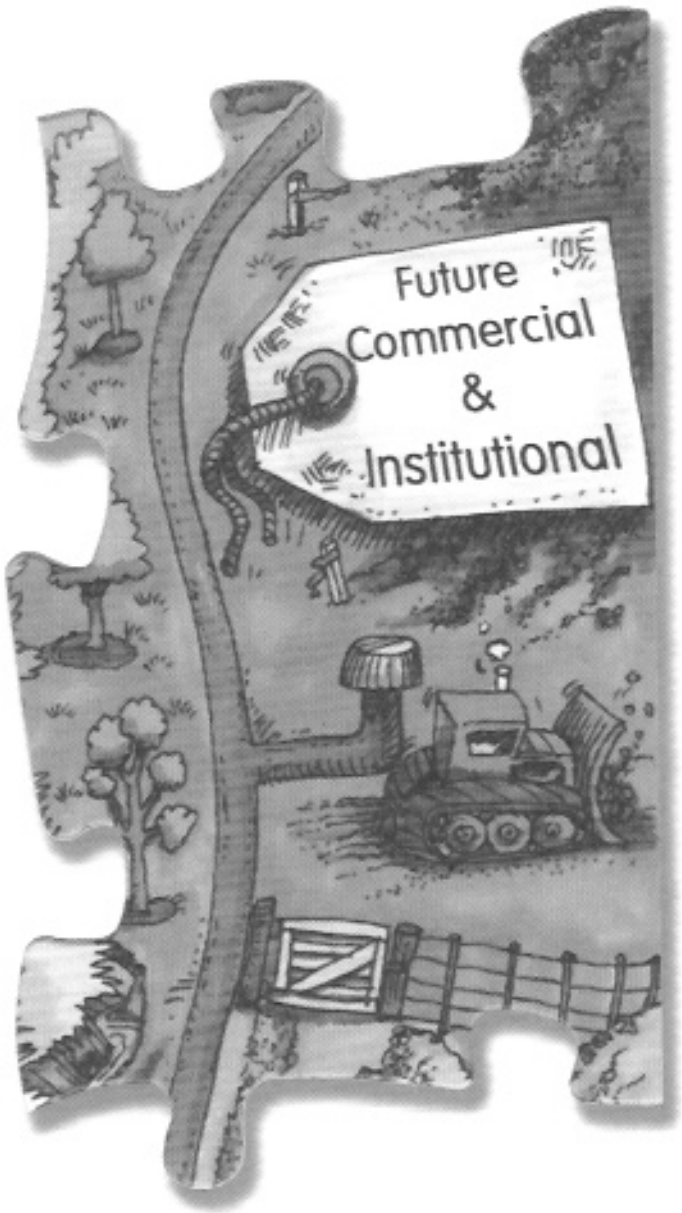
List all of the businesses and institutions in your town.

Estimate their current water use.

Are all the government buildings being billed for their water?

Future Commercial and Institutional Water Use (#8)

Take this opportunity to talk with all of the business owners and institution managers in the community. A local community development specialist or regional planning agency in the area may have some insights into businesses and institutions that could locate in your community.



Questions to Ask

List the businesses and institutions your community is likely to attract and develop over the next:

—10 years

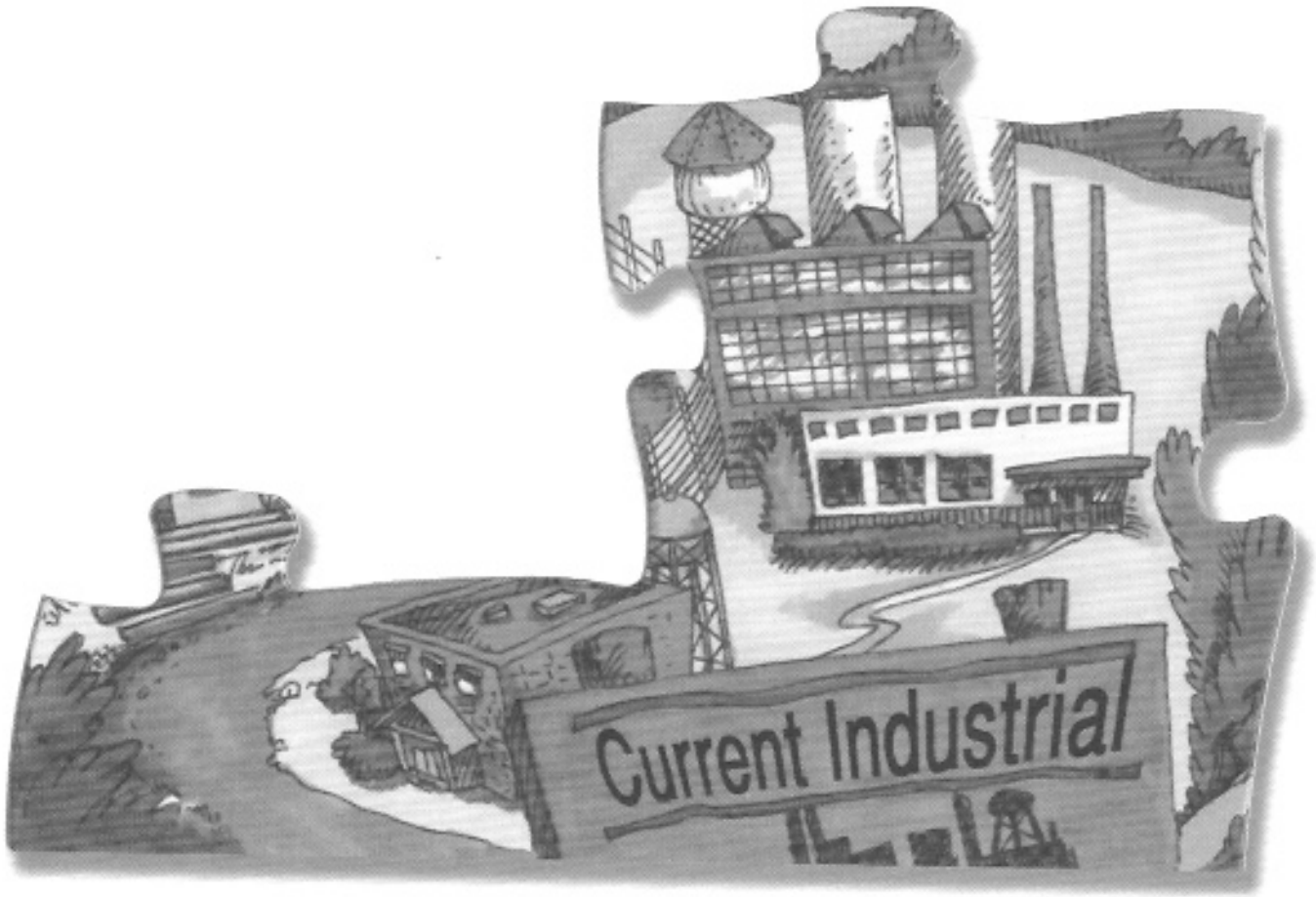
—20 years

—30 years

What are the current businesses and institutional plans for future expansion?

Current Industrial Water Use (#6)

Take this opportunity to visit each of the industries in the area and talk to them about their water needs.



Questions to Ask

List all of the industries in and around your town.

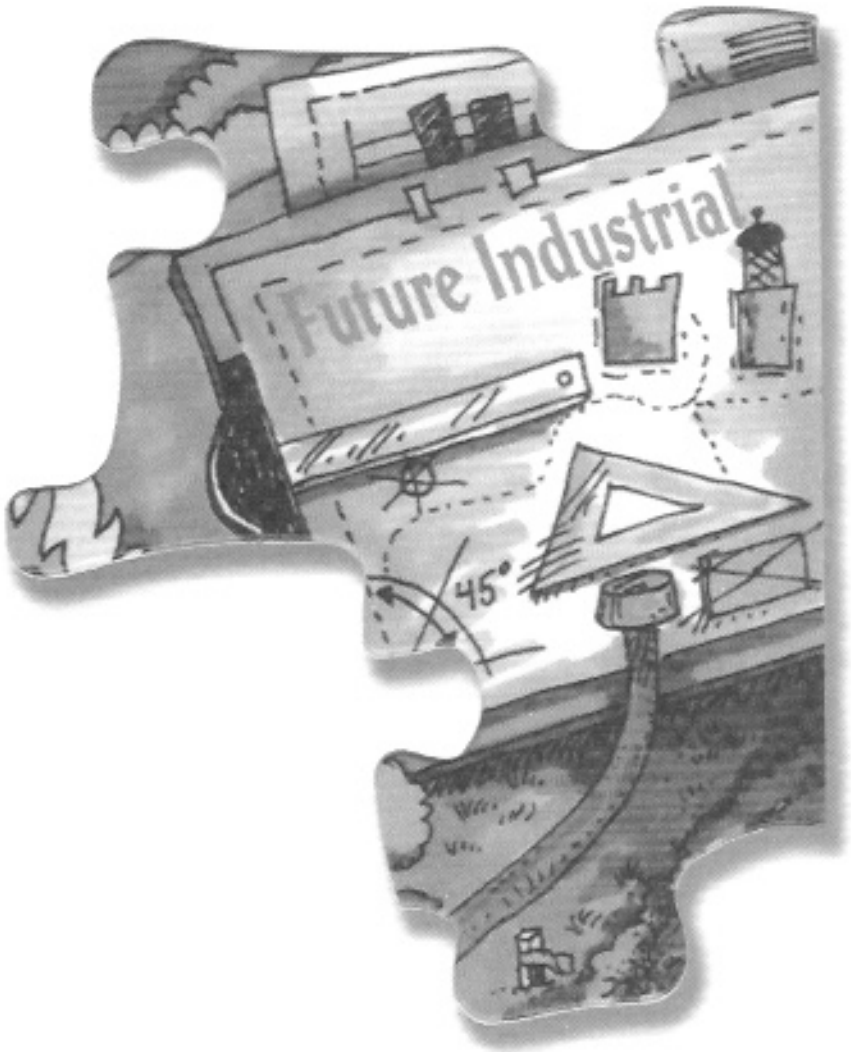
How are they meeting their current water needs?

What is each industry's water use on a per employee basis?

How do they envision their water needs changing in the next 20 years?

Future Industrial Water Use (#9)

Talk to industry representatives in and around the community about their plans for future expansion and their water quantity and quality needs. Contact the Ohio Department of Development about work on a community plan for attracting industries.



Questions to Ask

What is the projected growth in your town's current industries over the next 30 years?

Does your community have the water system capacity to attract new industries over the next 30 years?

What types of industries would you like to attract to your community?

Fire Protection in Small Communities (#10)

Talk to local insurance providers about fire insurance costs and requirements.

More importantly, talk to the local fire company about ways to improve fire protection in the community through the installation of dry hydrants in ponds and other water bodies in and around the community.

The local water system manager should be consulted about the potential and costs of using the community water system for fire protection.

Also contact the National Fire Protection Association for more detailed information on their standards for Water Supplies for Suburban and Rural Fire Fighting (NFPA 1231). The Association's phone number is 617-770-3000 and their web address is **www.nfpa.org**.

Questions to Ask

What are the current residential fire insurance rates in your community?

What would it take to lower insurance rates?

When was the water supply map for fire protection last updated?

What is the minimum amount of water our community needs for fire protection?

Questions for Outside Groups and Agencies

Future Residential Water Use (#7)

The U.S. Census is one source of population information. Check a local library for census information. Population information is also available from the Ohio Department of Development, Office of Strategic Planning at **www.odod.state.oh.us** by clicking on "Census 2000" or by calling 614-466-2115. Population information is also available through the OSU Extension Data Center at **www.ag.ohio-state.edu/~dataunit**.

Questions to Ask

Project your town's population over the next:

—10 years

—20 years

—30 years

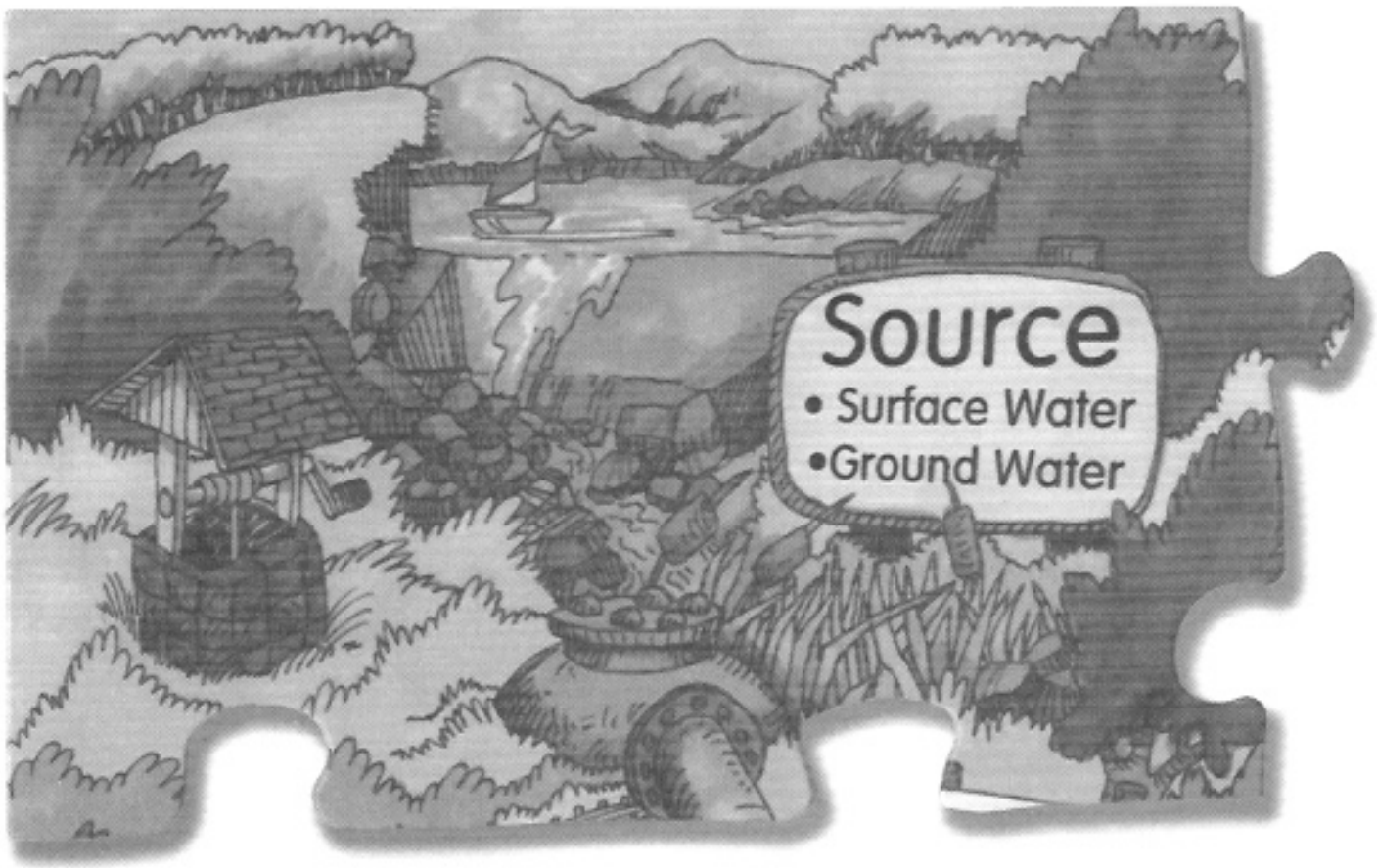
What plans are in place to ensure that future home development can be served with loop or grid water service?

Sources of Drinking Water for Small Communities (#11)

The Ohio Department of Natural Resources Division of Water publishes groundwater maps that can help estimate the potential yields of new wells. ODNR also keeps track of water availability from state lakes and reservoirs.

Check with nearby water utilities to determine if they have unused water capacity.

County-specific fact sheets on Water Resources and Groundwater Resources have been published by Ohio State University Extension for most Ohio counties and can be obtained from county Extension agents. The fact sheets list the water supplies in the county and their capacity, and describe the well yield and well-water quality commonly found in the county. These OSU Extension fact sheets can also be found at **http://ohioline.osu.edu**.



Questions to Ask

What is the well yield (in gallons per minute) of some recently constructed wells in your community?

List the lakes and reservoirs in your county and nearby counties.

List existing water systems in your county and nearby counties.

Technical Assistance for Water Systems (#36)

Contact another community that has just finished a water project and talk with them about their experience.

Questions to Ask

What type of technical assistance did your community need to successfully complete the project?

How much time did people from your community spend working with technical assistance providers?

What groups provided the most useful technical assistance?

For More Information

County-specific Water Resources OSU Extension fact sheets
http://ohioline.osu

County-specific Groundwater Resources OSU Extension fact sheets
http://ohioline.osu

Ohio Department of Development, Office of Strategic Planning
www.odod.state.oh.us

Population information, OSU Extension Data Center
www.ag.ohio-state.edu/~dataunit

National Fire Protection Association
www.nfpa.org

Water Testing, OSU Extension Fact Sheet AEX 314
setll.osu.edu

Where to Have Your Water Tested, OSU Extension Fact Sheet AEX 315
setll.osu.edu

Consumer Confidence Reports and emergency communication requirements
www.epa.state.oh.us/ddagw/ccr.html

Certified water testing labs
www.epa.state.oh.us/ddagw/pubs.html#certlabs

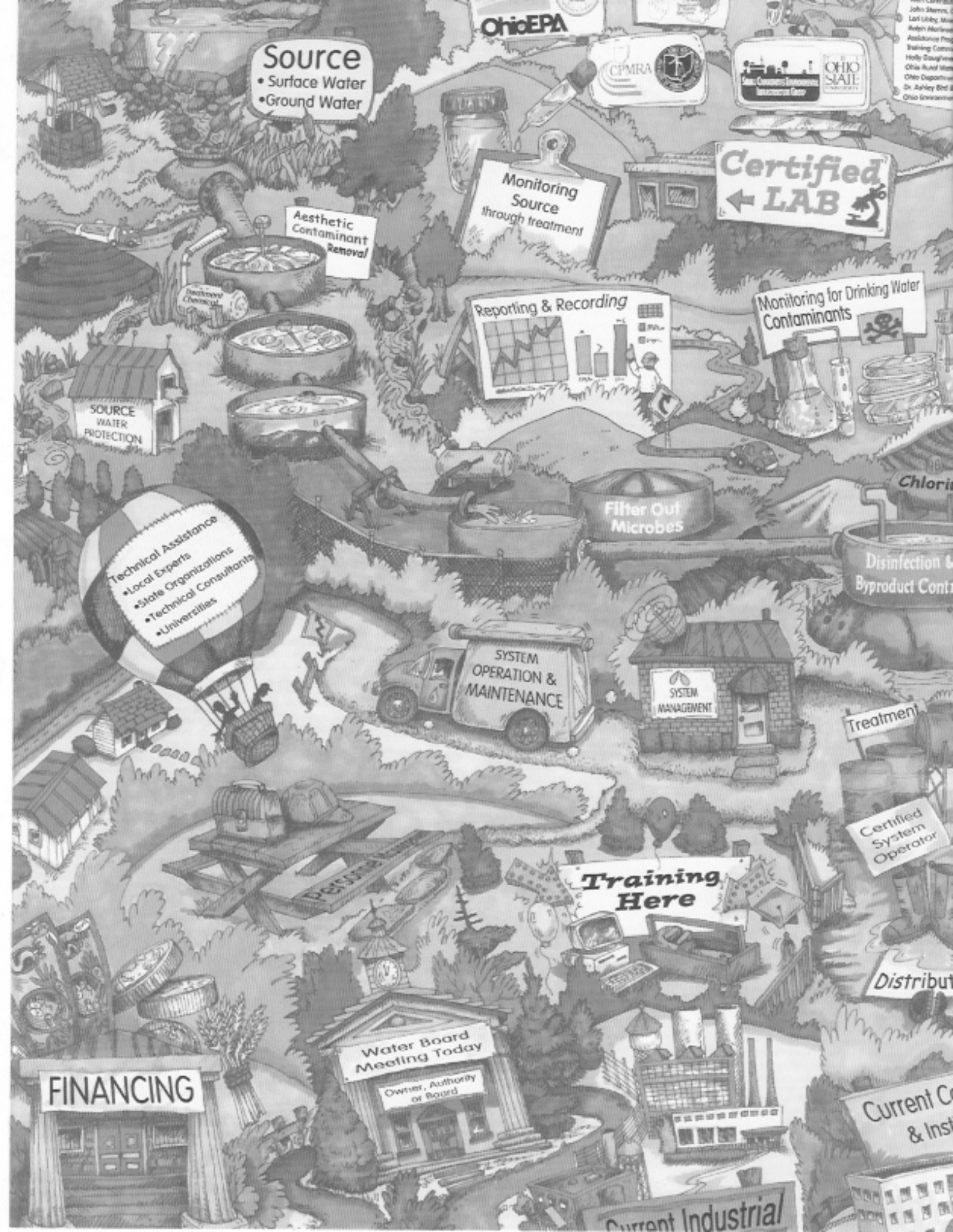
Water Facts

- Two-thirds of the water used in a home is used in the bathroom. Installing a low-flow toilet can save a family of four 45 gallons of water per day.
- You can drink more than 4000, 8 ounce glasses of tap water for the same price as a six-pack of soda pop.
- Over 40% of private wells are contaminated with bacteria.
- More than 800,000 new water wells are drilled in the US each year.
- The first United States water plant with filters was built in 1872 in Poughkeepsie, New York.
- In Altona, Germany in 1892, the water from the Elbe River was filtered before drinking. At the time, hundreds of people from nearby Hamburg (which did not filter their water) died from cholera. The citizens of Altona were untouched by this waterborne disease.
- In 1908, Jersey City, New Jersey and Chicago, Illinois were the first water supplies to be chlorinated in the United States.
- The Safe Drinking Water Act (SDWA) of 1974 represents the first time that public drinking water supplies were protected on a federal (national) level in the United States. Amendments were made to the SDWA in 1986 and 1996.

Multiple Barriers in Water Treatment

While at a water plant, ask the operator for a tour to look at how they are treating the water to protect the customers.

Ask to look at each of the "barriers" as illustrated below. Note: that if the drinking water source is groundwater, the natural soil is providing for filtration.


OhioEPA
Source
• Surface Water
•Ground Water
Monitoring Source through treatment
Certified LAB
Aesthetic Contaminant Removal
Reporting & Recording
Monitoring for Drinking Water Contaminants
SOURCE WATER PROTECTION
Technical Assistance
•Local Experts
•State Organizations
•Technical Consultants
•Universities
Filter Out Microbes
SYSTEM OPERATION & MAINTENANCE
SYSTEM MANAGEMENT
Treatment
Certified System Operator
Training Here
Water Board Meeting Today
Owner, Authority or Board
FINANCING