

9. Water Conservation Program

9.1. Introduction

Water is a limited resource that must be protected and conserved. Water conservation can play an important role in reducing water needs and, in turn, save costs in operation, construction of new facilities or extend the life of existing facilities. A successful water conservation program may serve as a cost effective means to reduce system demands and extend the service life of any existing or proposed facilities.

The purpose of this chapter is to:

- ? Explain Lewis & Clark’s role with regard to water conservation efforts;
- ? Summarize water conservation program information available from EPA;
- ? Summarize water conservation requirements from South Dakota, Iowa and Minnesota state governments; and
- ? Finally, to summarize the current conservation programs and practices of Lewis & Clark member systems.

9.2. Lewis & Clark’s Role in Water Conservation Efforts

Lewis & Clark is a unique rural water system – it will not sell water to individual households, farms or other consumers. Lewis & Clark will sell water, on a bulk basis, to existing municipalities and rural water systems in South Dakota, Iowa and Minnesota.

Lewis & Clark’s member systems are responsible for distribution and sale of water to the individual customers within their systems. Lewis & Clark’s responsibility ends when water is metered into the member system at its point of delivery. Therefore, Lewis & Clark has little, or no, authority or control of water after it enters its members’ system. Actual conservation programs are best implemented and administered by Lewis & Clark’s member systems.

Lewis & Clark will be a “resource” for its member systems to use for water conservation techniques, ideas and public education. This is an appropriate role for Lewis & Clark, in addition to what it will do as a system to make sure water is conserved through its internal operations. Water usage by Lewis & Clark’s

member systems is already conservative in nature - their collective water usage is well below the national per capita average.

Lewis & Clark is strongly in favor of water conservation and the efficient use of water. Lewis & Clark will take actions so it can efficiently collect, treat, store and convey water to its member systems. However, as mentioned above, Lewis & Clark's role in water conservation is limited in comparison to the impact its member systems and the end-users of the system's water supply can make toward conserving this resource.

9.3. Lewis & Clark's Water Conservation Efforts

Lewis & Clark's efforts toward water conservation will take a three-pronged approach: 1) conservation of water resources through efficient design and construction of the Lewis & Clark system infrastructure; 2) conservative administration and efficient operation of its water system; and 3) as a resource, or referral, to assist its member systems through distribution of water conservation information, educational materials and other resources. The following sections discuss opportunities to initiate and implement these approaches.

Another water system in South Dakota, the Mid Dakota Rural Water System, Inc., has implemented both "hardware" and "software" measures to achieve the desired water conservation. The "hardware measures include a filter wash recovery system at its treatment facilities, meters throughout the distribution system, pressure regulators, flow rate restrictors and low consumption plumbing fixtures. The "software" measures include rate schedules, rules and regulations, water supply contracts, ordinances, leak detection and repair programs and a public education program. Some of Mid Dakota's programs are not applicable to Lewis & Clark since Mid Dakota sells water directly to individual consumers and has more authority and control at the actual point of use.

Information and criteria from Mid Dakota's water conservation program is interspersed in the following sections.¹

¹ *Water Conservation Program Report*, Mid Dakota Rural Water System, Inc.

9.3.1. Design Criteria

Water conservation design criteria is planned to reduce peak daily flows and total volume of water used. Their purpose is to reduce water waste and still have the capacity to serve beneficial use adequately.

Design criteria regarding water conservation will mainly take the form of reducing water waste at the water treatment plant and installation of a telemetry and instrumentation system to monitor pipeline system operation. Metering will occur at service connections as well as master meters at key locations throughout the water transmission system (refer to Chapter 3). The instrumentation and telemetry system will provide information to system operators to alert them to situations requiring their immediate attention.

Water treatment plant design criteria have been incorporated to reduce the amount of water to be discharged to the lagoon system. Water and solids from the solids contact basin and rapid gravity filters will be routed to the solids thickener to concentrate solids and recycle water to the head end of the plant for re-processing. Water from the filters will include backwash water and filter-to-waste water. The thickened sludge will be discharged to the lagoons.

The pipeline system will include instrumentation and telemetry system components to enable operators to detect leaks by monitoring “unaccounted water” by metering flow and pressure at the treatment plant, each pump station, reservoir outflows and service connections. Reservoir water levels will also be monitored. Readings from these meters are obtained through a telemetry system and are compared to determine unaccounted water.

Lewis & Clark will not have individual service taps into its pipeline. Service taps typically provide a significant potential for leaks in a rural water system.

9.3.2. Administration and Operation

Efficient operation and administrative practices of the Lewis & Clark system can contribute to reduction of waste and conservation of water.

Lewis & Clark will be designed to monitor the pipeline system to enable detection of “unaccounted water”. If the unaccounted water is high in certain service areas, Lewis & Clark will implement leak detection techniques and repair the leaks. Meters will be tested for accuracy, on a set schedule, and repaired if necessary.

The rate schedule Lewis & Clark currently contemplates will consist of (1) a meter charge, designed to recover fixed costs, to each member, which will be based at the time of determination on the ratio of each member’s planned water usage to the total of all members’ planned water usages; and (2) a per gallon consumption charge, designed to recover variable costs from each member that will be based on the amount of water purchased by each member from Lewis & Clark. A declining block rate schedule will not be used.

9.3.3. Resource Materials and Information

Lewis & Clark will act as a resource to aid its member systems in their efforts to establish and implement water conservation programs. Many of the member systems currently have water conservation programs and emergency response plans in place. Member systems themselves can assist other systems to develop and implement water conservation programs.

There are several ways Lewis & Clark will assist its membership to reduce water usage, including:

- ? Develop public information and education programs to provide users with suggestions to reduce water usage and introduce conservation practices;
- ? Obtain or prepare brochures or newsletter articles for public education programs to promote water conservation. This media can be mailed to each member system on an annual basis (or more frequently if needed). Additional information can be prepared for distribution to each system’s customers, if requested.
- ? Act as a contact, or conduit, to other rural water systems and agencies to collect and disseminate information;
- ? Maintain a “library” of information and contacts within the water industry to assist member systems; and
- ? Organize and conduct seminars and workshops.

There is a wealth of information available from several sources, including large public information campaigns. Information is available from governmental sources, including: Reclamation, EPA, Rural Development and others. Also, AWWA (American Water Works Association), NRWA (National Rural Water Association), state rural and municipal water associations have a substantial amount of information and materials. An extensive amount of information is also available on the Internet. Some of the information regarding EPA water conservation guidelines is summarized in the following section.

9.4. EPA Water Conservation Guidelines

The EPA has generated guidelines for use by water utilities in preparing water conservation plans (the remainder of this section is excerpted from an EPA publication).² These guidelines provide a framework that water managers can use to assess the cost effectiveness of conservation, as well as the value of conservation in avoiding, lowering, or postponing supply-side capital and operating costs. EPA has prepared three sets of guidelines as summarized in Table 9.4-1.

Each of the guidelines generated by the EPA follows a similar framework for the planning process; however, the basic, intermediate, and advanced guidelines vary in terms of the scope of the analysis and the amount of detail required when preparing a conservation program. The basic guidelines provide a simplified planning approach. The intermediate and advanced guidelines lead to a comprehensive conservation program.

Table 9.4-1
System Size Categories and Type of Guidelines (from EPA)

System Size Category (Safe Drinking Water Act)	Applicable Guidelines
Serves fewer than 3,300 people	Basic Guidelines or Capacity-Development Approach
Serves between 3,300 and 10,000 people	Basic Guidelines Up to 10,000 people served
Serves more than 10,000 people	Intermediate Guidelines Up to 100,000 people served
	Advanced Guidelines More than 100,000 people served

² *Water Conservation Plan Guidelines*, August 6, 1998, U.S. Environmental Protection Agency.

One important distinction among the guidelines is the number of conservation measures recommended for consideration by managers. The guidelines reflect a cumulative approach to conservation measures, which are organized into three levels (see Table 9.4-2). Each level includes additional categories of measures. For example, the intermediate guidelines include more measures than the basic guidelines and the advanced guidelines include more measures than the intermediate guidelines. This framework recognizes the general continuum of conservation measures available to water systems with different needs and capabilities.

9.5. State Water Conservation Guidelines

State agencies can also be contacted for information regarding water conservation and planning. Some states in the water service area require preparation, implementation and continuing review and updates of water conservation programs and emergency planning.

9.5.1. South Dakota

South Dakota does not have formal water conservation guidelines.

9.5.2. Iowa

The Iowa Department of Natural Resources and Iowa Association of Municipal Utilities have prepared a set of guidelines for developing emergency conservation plans for water utilities.³ Under Iowa's state water use program, cities must develop local water emergency plans and long-term conservation policies.

The purpose for an emergency water conservation program is to reduce water demands from any source experiencing a temporary shortage. Temporary shortages and emergencies can occur as a result of accidental contamination, mechanical problems, power failures, drought and other natural disasters.

A comprehensive water conservation plan is also required when requesting new water use permits or for renewing existing permits. Water conservation programs are intended to reduce water demands, improve the efficiency in use and reduce water losses.

³ *Water Conservation For Small Utilities*, Iowa Association of Municipal Utilities and Iowa Department of Natural Resources

Table 9.4-2
Water Conservation Guidelines and Associated Conservation Measures ¹

Measures	Advanced Guidelines		
	Intermediate Guidelines		
	Basic Guidelines		
LEVEL 1 MEASURES			
Universal metering ²	<ul style="list-style-type: none"> - Source-water metering - Service-connection metering and reading - Meter public-use water 	<ul style="list-style-type: none"> - Fixed-interval meter reading - Meter-accuracy analysis 	<ul style="list-style-type: none"> - Test, calibrate, repair, and replace meters
Water accounting and loss control ³	<ul style="list-style-type: none"> - Account for water - Repair known leaks 	<ul style="list-style-type: none"> - Analyze nonaccount water - Leak detection and repair strategy - Automated sensors/telemetry 	<ul style="list-style-type: none"> - Loss-prevention program
Costing and pricing ²	<ul style="list-style-type: none"> - Cost-of-service accounting - User charges - Metered rates 	<ul style="list-style-type: none"> - Cost analysis - Nonpromotional rates 	<ul style="list-style-type: none"> - Advanced pricing methods
Information and education ²	<ul style="list-style-type: none"> - Understandable water bill - Information available 	<ul style="list-style-type: none"> - Informative water bill - Water-bill inserts - School program - Public-education program 	<ul style="list-style-type: none"> - Workshops - Advisory committee
LEVEL 2 MEASURES			
Water-use audits ²		<ul style="list-style-type: none"> - Audits of large-volume users - Large-landscape audits 	<ul style="list-style-type: none"> - Selective end-use audits
Retrofits ³		<ul style="list-style-type: none"> - Retrofit kits available 	<ul style="list-style-type: none"> - Distribution of retrofit kits - Targeted programs
Pressure management ³		<ul style="list-style-type: none"> - Systemwide pressure management 	<ul style="list-style-type: none"> - Selective use of pressure reducing valves
Landscape efficiency ⁴		<ul style="list-style-type: none"> - Promotion of landscape efficiency - Selective irrigation submetering 	<ul style="list-style-type: none"> - Landscape planning and renovation - Irrigation management
LEVEL 3 MEASURES			
Replacements and promotions ²			<ul style="list-style-type: none"> - Rebates and incentives (nonresidential) - Rebates and incentives (residential) - Promotion of new technologies
Reuse and recycling ²			<ul style="list-style-type: none"> - Industrial applications - Large-volume irrigation applications - Selective residential applications
Water-use regulation ²			<ul style="list-style-type: none"> - Water-use standards and regulations - Requirements for new developments
Integrated resource management ²			<ul style="list-style-type: none"> - Supply-side technologies - Demand-side technologies

¹ Table from Water Conservation Plan Guidelines, EPA. See Appendix A of EPA reference for a description of the measures.

² Measure affects both average and peak demand.

³ Measure affects average-day demand.

⁴ Measure affects maximum-day (peak) demand.

Iowa recommends three levels of plans of action depending on the level of conservation required. The level of conservation required can be determined by the level at which the system is operating.

Action Plan I (Water Watch) is the voluntary cooperation of users in water conservation. Under a water watch, all users are encouraged to limit all nonessential uses of water during the time of shortage. These voluntary limits would include:

1. No watering of lawns between the hours of 8:00 am and 8:00 pm.
2. No filling of private swimming pools, children's wading pools, reflecting pools or any other pool or pond.
3. No water used to wash streets, driveways, sidewalks or building exteriors.
4. No water used for nonessential cleaning of commercial and industrial equipment, machinery and interior spaces.
5. Water should be served at restaurants only upon request of the customer.

Action Plan II (Water Warning) is the next recommended step in implementing a local water conservation program. This plan uses a two-tiered approach to restrict the ways customers can use water.

Tier I – would include the same items listed in Action Plan I and would be mandatory rather than voluntary:

1. No watering of lawns between the hours of 8:00 am and 8:00 pm
2. No filling of private swimming pools, children's wading pools, reflecting pools or any other pool or pond.
3. No water used to wash streets, driveways, sidewalks or building exteriors.
4. No water used for nonessential cleaning of commercial and industrial equipment, machinery and interior spaces.
5. Water should be served at restaurants only upon request of the customer.

Tier II – would include the following restrictions:

1. No outside water use except for domestic, sanitation and fire protection.
2. No commercial and industrial uses of water not essential in providing products or services.

3. No irrigation of agricultural crops.
4. No watering lawns or golf courses.
5. No recreational and leisure water uses.
6. Water use not necessary for the preservation of life or the general welfare of the community is prohibited.

Action Plan III (Water Rationing) requires that all customers be allocated a monthly water allotment and that regular meter readings be taken to determine customer compliance. The quantity allotted is generally considered to be the minimum required for interior use.

9.5.3. Minnesota

The Minnesota Department of Natural Resources – Division of Waters has prepared a set of guidelines for developing emergency and conservation plans for water supply systems.⁴ These guidelines are divided into four parts. The first three parts include:

1. Water Supply System Description and Evaluation;
2. Emergency Response Procedures; and,
3. Water Conservation.

The first three parts apply statewide and Part 4 relates to comprehensive requirements for the communities in the seven-county Twin Cities Metropolitan Area.

Part 1 - Water Supply System Description and Evaluation. This section includes analysis of water demand, treatment and storage capacity, sources of water supply and adequacy of system to supply demand.

Part 2 - Emergency Planning for Public Water Suppliers. Water emergencies can occur as a result of accidental contamination, mechanical problems, power failures, drought and other natural disasters. It is important to develop an emergency response procedure and to provide a format for steps to improve emergency preparedness. During periods of limited water supplies public water

⁴ *Guidelines for Developing Public Water Supply Emergency and Conservation Plans*, Minnesota Department of Natural Resources Division of Waters.

suppliers are required to allocate water based on the priorities established in Minnesota Statutes 103G.261. These priorities are listed as follows:

1. Domestic water supply, excluding industrial and commercial uses of municipal water supply, and use for power production that meets contingency requirements.
2. Water uses involving consumption of less than 10,000 gallons per day.
3. Agricultural irrigation and processing agricultural products.
4. Power production in excess of the use provided for in the contingency plan under first priority.
5. Uses, other than agricultural irrigation, processing of agricultural products, and power production.
6. Non-essential uses defined by Minnesota Statutes 103G.291 as lawn sprinkling, vehicle washing, golf course and park irrigation and other non-essential uses.

Additional information on emergency planning is available from the American Water Works Association, Member Services Department, 6666 Quincy Avenue, Denver, Colorado 80235, (303) 794-7711.

An Emergency Response Procedure should be outlined for each system. The outline should include a telephone list of emergency contacts

Part 3 - Water Conservation Plans for Public Water Suppliers. Water conservation programs are intended to reduce water demands, improve the efficiency in use and reduce water losses.

Short-term water conservation measures are included in emergency response procedures to reduce water demands when supplies are limited, and long-term conservation measures can help manage the ever-increasing demands being placed on the water resources.

Minnesota water users are required (MN Rules 6115.0770), to employ the best available means and practices to promote the efficient use of water. It is also required under Minnesota law, that prior to seeking approval for new construction of wells or authorization for increased volumes of water, public water suppliers must implement demand reduction measures.

Guidelines prepared by Minnesota DNR outline the items that must be considered while preparing water conservation plans for both short-term emergency plans and long-term measures to improve water use efficiencies. Specific items that are recommended to be included in the plan are:

- A. Role that the conservation plan has in managing demands and supplies. Specific goals and plan for achieving these goals should be defined in the plan.
- B. Water conservation potential should be assessed by using information on water demand and by evaluating seasonal demand, unaccounted for water and customer water use.
- C. Water Conservation Program should include the following specific items:
 - 1. Metering
 - 2. Water Audits, Leak Detection and Repair
 - 3. Conservation-Oriented Water Rates
 - 4. Regulation
 - 5. Public Education and Information Programs
 - 6. Retrofitting Programs
 - 7. Pressure Reduction
- D. Plan should be formally adopted by community/water utility after public review.

Additional information is available by request from:

Department of Natural Resources – Division of Waters
500 Lafayette Road, St Paul, MN 55155-4032
(612) 296-4800

9.6. Member System Water Conservation Programs

It is important to note that many of Lewis & Clark's member system have already implemented many of the suggestions made in this section of the Final Engineering Report. A summary of the member systems and their current conservation and emergency programs are as follow in Table 9.6-1.

It is appropriate to note that all member systems meter usage to their customers. Lewis & Clark's member systems also have leak detection programs to maintain a good accountability of water use/loss within their water systems.

Table 9.6-1
Summary of Current Conservation Programs of Lewis & Clark Members

South Dakota Systems	
Beresford	City does not have a water conservation plan.
Centerville	The City has an ordinance of lawn watering and water restrictions
Harrisburg	Receives its water from the Lincoln County RWS and follows their water conservation plan, which is also taken from the Sioux Falls conservation plan. The city also has an ordinance in effect for: 1) authority to control use of water, and 2) uses regulated or prohibited.
Lennox	City ordinance for water use restrictions.
Madison	City has ordinance for water use restrictions and prohibited uses of water.
Parker	The City has no ordinance, but relies on voluntary lawn watering restrictions
Sioux Falls	The City has a detailed water conservation plan and it will be expanded to include a plumbing retrofit program. Sioux Falls water conservation plan is also in effect for its bulk users (Lincoln County RWS).
Tea	The City does not have an ordinance for water use restrictions. However, the City does have voluntary restrictions for lawn watering and they follow the Lincoln County RWS guidelines for water conservation since they are users of Lincoln County RWS.
Lincoln County RWS	Receives 90% of its water from the Sioux Falls and follows their water conservation program. Lincoln County RWS has water use restrictions.
Minnehaha CWC	Minnehaha CWC has a water use restriction plan.
South Lincoln RWS	South Lincoln RWS does not have a water conservation plan in place. They do have high water rates.
Minnesota Systems	
Luverne	The City has a water conservation plan and emergency preparedness plan as required by the Minnesota DNR.
Worthington	The City has a water conservation plan and emergency preparedness plan as required by Minnesota DNR.
Rock County RWS	Rock County RWS has a water conservation plan and emergency preparedness plan and is approved by the Minnesota DNR
Lincoln-Pipestone RWS	Has adopted an Emergency and Conservation Plan which meets the requirements from Minnesota DNR
Iowa Systems	
Boyden	The City has a conservation plan and City ordinances.
Hull	Hull is working on developing a plan
Sheldon	City has a water conservation plan outlined in the City ordinances.
Sibley	The City has passed an ordinance and has a water conservation plan. They perform a leak detection survey within their system every 2 years.
Sioux Center	The City has an ordinance establishing a water conservation plan.
Clay Regional RWS	Policy and Guidelines for water conservation and emergency water use restrictions.
Rural Water No. 1	Policy and Guidelines for water conservation and emergency water use restrictions.
Rock Rapids	Rock Rapids Utilities has a Water Conservation Emergency plan. (In 1990 they passed resolution declaring water conservation emergency, the minutes from meeting state that if there is no plan in place, the Iowa Municipal Utilities Association has a model plan)