



American Water Works
Association

The Authoritative Resource on Safe Water®

Using the AWWA Utility Management Standard for Source Water Protection

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Early Source Water Protection Program

- *“There shall be no man or woman dare to wash nay unclean linen, wash clothes,...nor rinse or make clean any kettle, pot, or pan or any suchlike vessel within twenty feet of the old well or new pump. Nor shall anyone aforesaid, within less than a quarter mile of the fort, dare to do the necessities of nature, since by these unmanly, slothful, and loathsome immodesties, the whole fort may be choked and poisoned.”*

Governor Gage of Virginia, Proclamation for Jamestown, VA (1610)



Source Water Contamination in the News

- The Elk River chemical spill on Jan. 9, 2014 in West Virginia
- The contamination of drinking water by microcystin on Aug. 2, 2014 in Toledo, Ohio
- The massive mine tailings spill on Aug. 4, 2014 in central British Columbia



Source Water Protection (SWP)

- **SWP** involves maintaining, safeguarding, and/or improving the quality of a water source (surface water or groundwater) used as a supply for drinking water
- **SWP Programs** identify, prioritize, implement, and evaluate specific activities and management practices that will contribute toward achieving this goal



Concept of SWP Standard

- **SWP** is a highly site-specific process that reflects the inherent diversity of natural waters and the areas from which they are derived
- **Successful SWP programs** may vary widely in their details; but it is a premise that successful programs share several common fundamental elements



Rationale

- To gain a better understanding of the AWWA Utility Management Standard for Source Water Protection (SWP) – also known as the G-300 standard
- To be able to protect drinking water from source to tap



Learning Objectives

- As a result of this workshop...
 - You will know the essential elements of a SWP program
 - You will be able to identify opportunities and challenges to protect your source water
 - You will be able to incorporate these elements in your SWP program



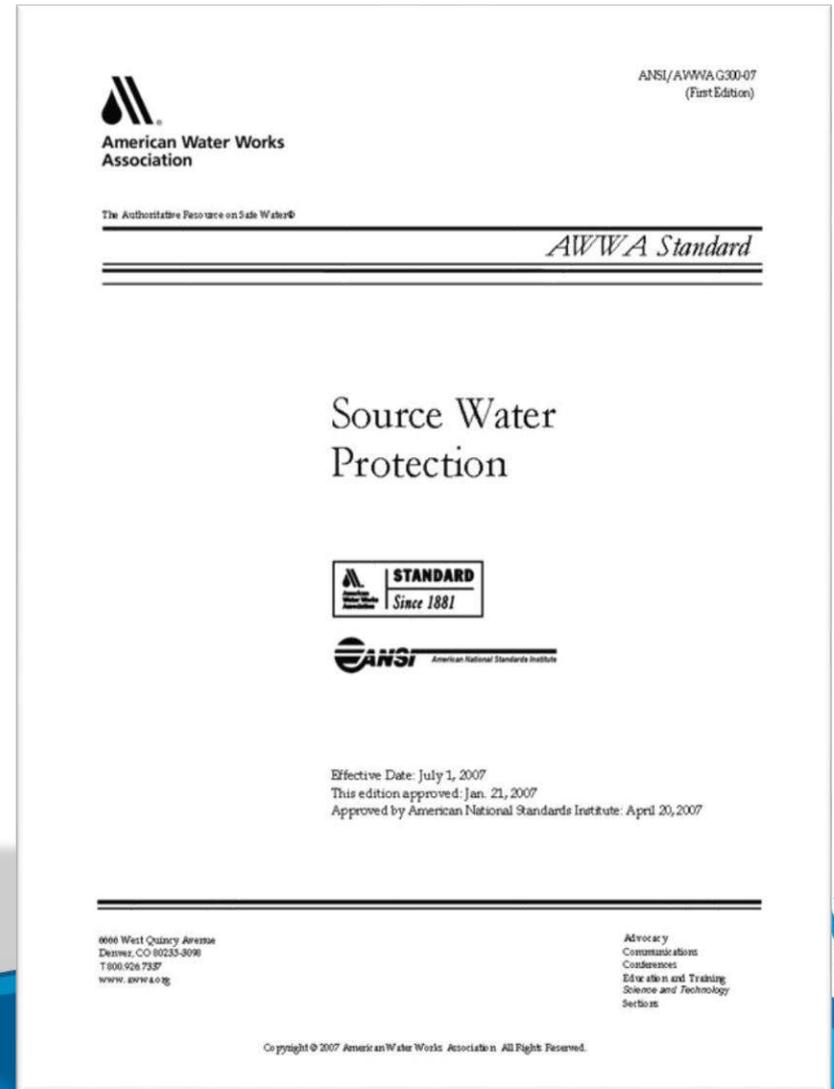
Agenda

- Overview of AWWA Utility Management Standard for SWP
- Description of the six essential elements of SWP Standard for the implementation of a SWP program
- Review content of worksheets in the Operational Guide

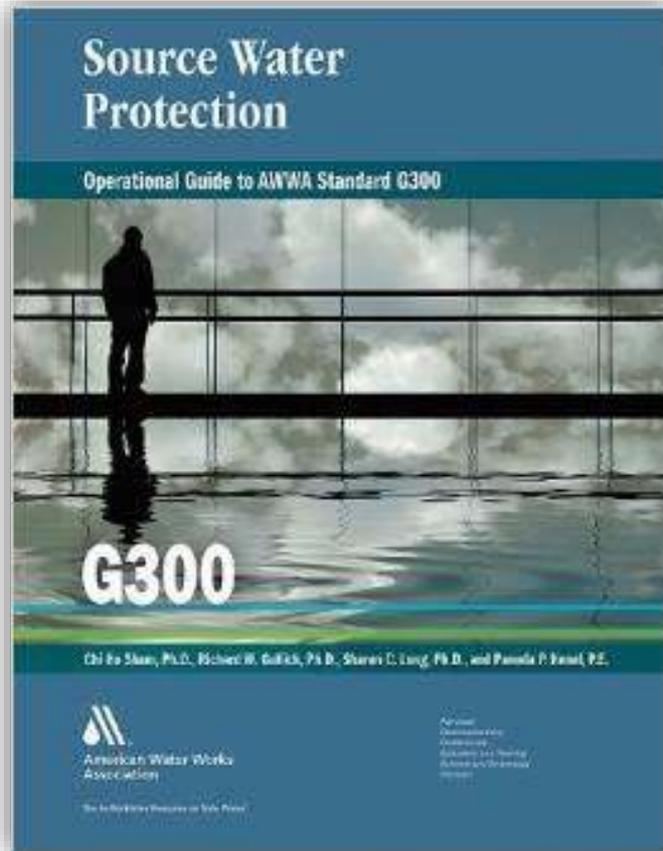


AWWA SWP Standard

- Developed under AWWA Standards Council by SWP Committee
- 2007 – AWWA approved and published the first edition of G300 Standard – effective on July 1, 2007
- 2014 – the second edition of the G300 Standard has been approved and published – effective on June 1, 2014



AWWA SWP Standard – Operational Guide



- Developed under AWWA Technical & Educational Council by SWP Committee in 2009, to support the implementation of Utility Management Standard for SWP (G300)
- Guidebook completed and published in May 2010



AWWA SWP Standard

- Scope - describes the essential elements for the effective protection of source waters.
- Purpose - defines the minimum program requirements for the protection of source waters.
- Application – referenced in the evaluation of source water protection for recognition (e.g., AWWA Exemplary SWP Awards); taking steps to achieve SWP as a component of the multiple barrier approach

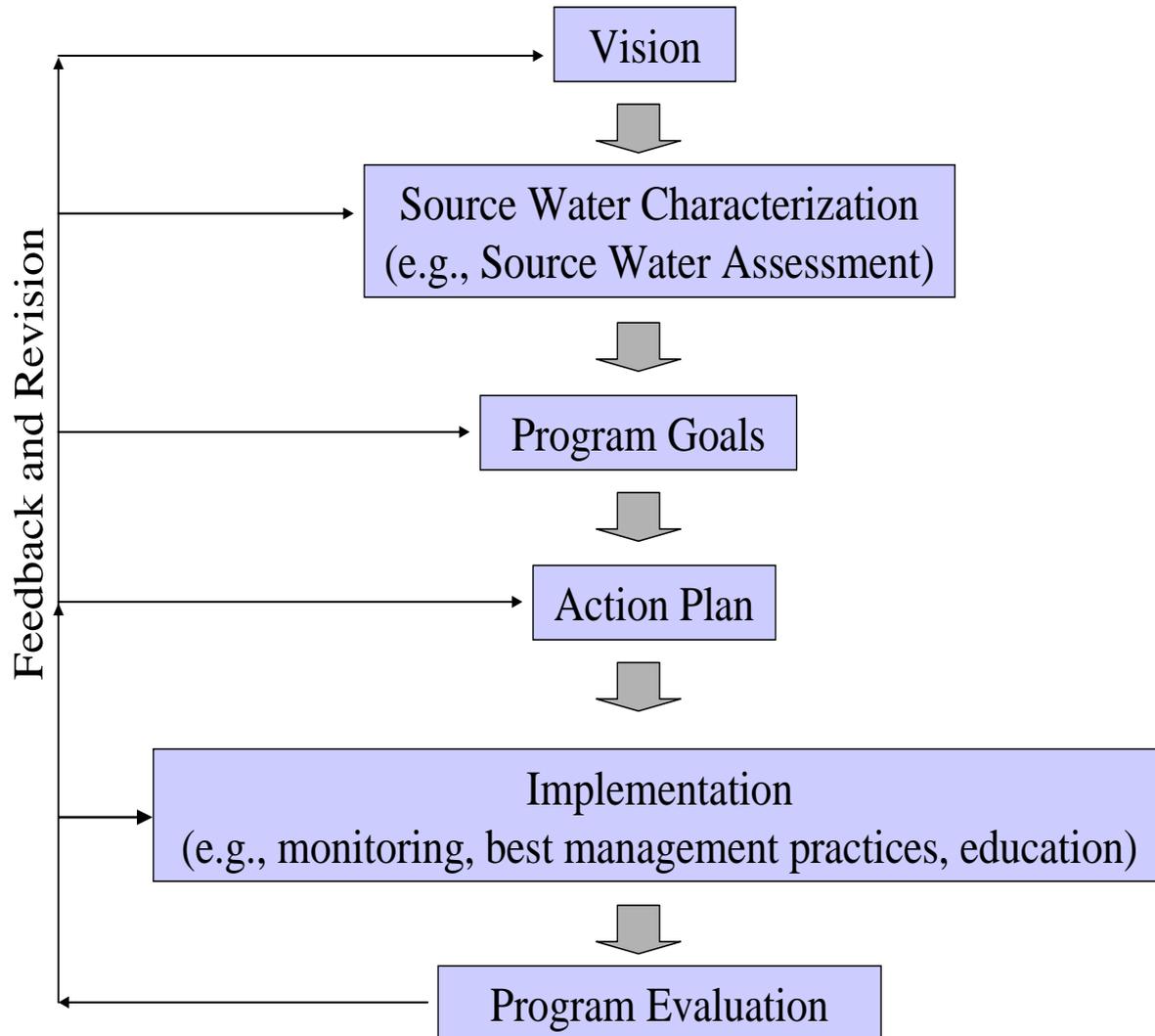


AWWA SWP Standard

- The minimum requirements for a source water program include six primary elements:
 1. A source water protection program vision;
 2. Source water characterization;
 3. Source water protection goals;
 4. Source water protection action plan;
 5. Implementation of the action plan; and
 6. Periodic evaluation and revision of program.
- * **Involvement of stakeholders throughout the process**



Essential Elements of SWP Standard



Key Points of SWP Standard

- Although each of these primary elements may differ greatly in their required effort or complexity, they are each vital to the success of the program. Basic success in each element must be demonstrated to obtain recognition in the area of SWP.
- Within this generalized framework, individual utilities may establish and maintain SWP programs that account for their unique local conditions, incorporate the interests of local stakeholders, and reflect sustainable long-term commitments to the process by all parties.



Vision

- A formalized vision that guides the development and implementation of a SWP program.
- A statement of commitment to SWP.
- Helps to align priorities and resources for the SWP program.



An Example of a SWP Vision (Groton Utilities, CT)

Vision:

To achieve long-term preservation of safe and sustainable drinking water supplies through proactive watershed protection in the Groton Utilities public water supply watersheds.



An Example of a SWP Vision (Philadelphia, PA)

Vision:

- “*Green City, Clean Waters*” - “unite the City with its water environment, creating a green legacy for future generations while incorporating a balance between ecology, economics and equity”

Mission statement:

- “To preserve and enhance the health of the region’s watersheds through effective wastewater and storm water services and the adoption of a comprehensive watershed management approach that achieves a sensible balance between cost and environmental benefit and is based on planning and acting in partnership with other regional stakeholders”.



Source Water Characterization

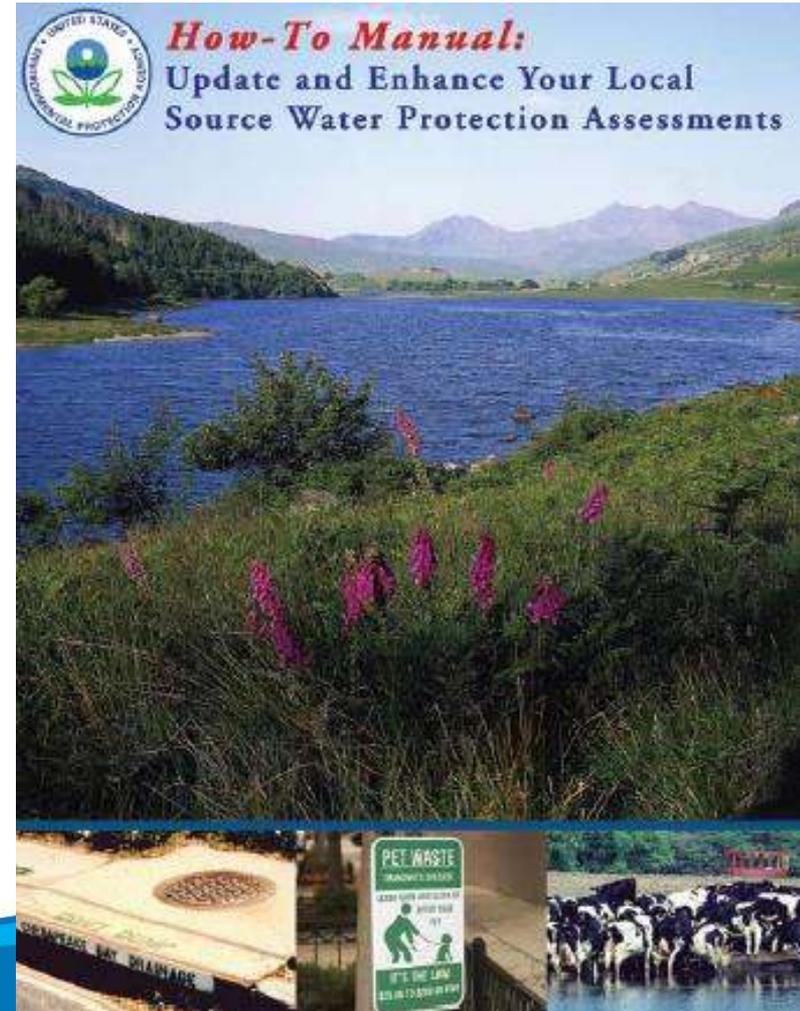
Characterization and assessment of the source water and the land or subsurface area from which the source water is derived

- Obtain the understanding and knowledge needed to develop the goals and plans to implement the actions that will realize the source water protection vision
- Provide information for conducting a risk assessment/susceptibility analysis
- Inform prioritization of water quality and SWP issues and contamination sources



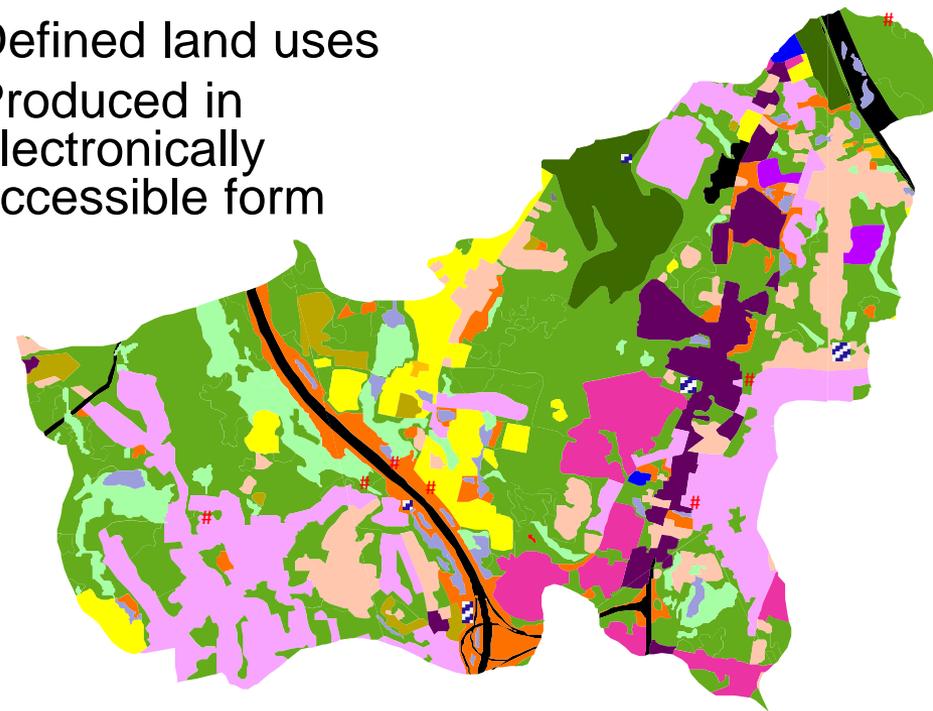
Characterization Activities

- Delineation of Source Areas of Concern
- Water Quality Information
- Contaminant Source Inventory Data
- Land Use Analysis
- Physical Barrier Effectiveness Determination
- Intake Structure
- Filling Information Gaps and Needs
- Analysis of Vulnerability/ Susceptibility



Example: Source Water Protection Area Delineation and Land Use Analysis

- Defined perimeter of catchment/watershed
- Defined land uses
- Produced in electronically accessible form



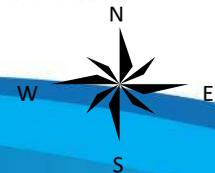
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Land Use Categories



0.9 0 0.9 1.8 Kilometers



Contaminant Source Inventory

Norfolk, NE Wellhead Protection Area

- more than 12 square miles
- 185 residential sites; each of which is estimated to have one domestic well
- wells at 20 commercial sites, 29 monitoring wells and approximately 20 irrigation wells

Examples on inventory

- Fuel oil storage tanks: location and size
- Pesticide/herbicide storage and usage: location and amounts



Property Delineation

Norfolk, NE Wellhead Protection Area



Program Goals

Goals and objectives need to be formulated

- To **guide** the SWP program and its elements
- To **target** problems through characterization and risk assessment processes
- To address **drivers** that motivate the SWP program (e.g., vision statement)
- To address **current and future** issues
- To **prioritize** concerns of the greatest importance and specify timelines and measurable goals



Program Goals

- Both internal and external **stakeholders** should be involved in the development of the goals
- Can be both relatively general and more detailed
- Should address water quality issues such as public health, treatment requirements and cost, and aesthetic concerns, but may also include other considerations such as environmental stewardship, equity, and ...
- Should consider areas where success is most likely



Program Goal Example

The SWP plan for the Schuylkill River incorporates the following seven (7) major objectives (PWD 2006):

- Establish the Schuylkill Action Network as a permanent watershed-wide organization charged with identifying problems and prioritizing projects and funding sources to bring about real improvement in water quality throughout the Schuylkill River watershed
- Create a long-term, sustainable fund to support restoration, protection, and education projects in the Schuylkill River watershed



Program Goal Example (continue)

- Increase awareness of the Schuylkill River watershed's regional importance as a drinking water source
- Initiate changes in policies and decision-making that balance and integrate the priorities of both the Safe Drinking Water Act and Clean Water Act
- Establish the Early Warning System as a regional information sharing resource and promote its capabilities for water quality monitoring and improving emergency communications
- Reduce point source impacts to water quality
- Reduce non-point source impacts to water quality



Action Plan

The action plan **identifies required actions** (management practices, statutory or regulatory changes, agreements, etc.) needed to mitigate existing and future threats to source water

Activities address each desired SWP goals

- For each action item the plan should identify *what, why, where, who, how, and when*
- Includes prioritization, timetable, resources, potential obstacles, measures of success



Additional Components for Action Plan

- Compliance with regulatory requirements
- Security planning and implementation
- Emergency preparedness and response
- Health and safety management



Implementation

Implementation of the Action Plan is the core of any SWP program. **Planning without implementation does not provide results**, and without this step, no actual protection takes place

Plan ≠ Implementation

- Develop a comprehensive and implementable plan
- Use an adaptive management approach to respond to unexpected challenges and barriers
- Adhere to an established timeline

Plan descriptions say an organization is “going” to do something

Implementation descriptions describe what protection activities have already been “done”



Implementation

- Use milestones and achievement benchmarks
- Keep track of changes to roles and responsibilities
- Identify obstacles and look for means to overcome these obstacles or other means of reaching the objectives
- Assess any funding changes during implementation of the project and adjust accordingly
- Establish process for contingency planning and periodic revision and improvement of the program implementation tasks



Program Evaluation

SWP Plan should be a living document, continuously undergoing improvement in an iterative process

- Include provisions in SWP Plan for review and revision
 - Periodic, scheduled review
 - In response to changes in sources or implementation performance
- Modify the utility's vision, characterization, goals, action plan, and implementation elements
- Measure the accomplishment or completion of projects, programs, and activities identified in the action plan
- Identify obstacles to success and means to overcome those obstacles



Summary

- Source water protection is a highly site-specific process that reflects the inherent diversity of the environment
- Successful source water protection programs may vary substantially in their details; but they share six fundamental elements



Testimony from Bob Morgan of Beaver Water District (Arkansas)



- G300 and the operational guide were a tremendous help in organizing our source water protection plan into a coherent document. Also, the checklists in the operational guide walked us through all of the elements of a source water program. Because of the checklists, we thought about items that previously we had not considered as part of source water protection. Finally, having a program that is in accordance with the American Water Works Association standard gives us credence with many of the stakeholders that were somewhat reluctant at first.



Worksheets

- From Operational Guide to AWWA Standard

Worksheet A: Developing a Vision

	High	Medium	Low	None
1. Is there a written mission statement or policy adopted by the governing board of the utility that specifically addresses SWP?	Organizational mission statement	Policy statement		No statement of any form
2. Is the SWP vision (mission statement or policy) distributed and understood throughout the organization?	All staff	Management level only	Board/Directors only	Not known at any levels
3. Does your mission statement recognize that SWP is one of the multiple barriers for drinking water production?	Yes		No	
4. Does the utility mission statement include commitment of, or intention to commit, sufficient resources?	Yes		No	
5. Have key stakeholders been identified and involved in development of the mission statement (e.g., was there a process in which outside entities had the opportunity to comment)?	Extensive identification and contact efforts	Partial survey and contact	Minimal effort	Complete lack of stakeholder involvement
6. Is there a process for regular/periodic review of the SWP vision? When was the SWP vision last reviewed?	Yes		No	
7. <i>Optional</i> Is the SWP vision available to the public (in Consumer Confidence Report, Annual Report, other Outreach Materials, and/or the utility's Web site)?	Yes		No	

Vision Questions

1. Is there a written mission statement or policy adopted by the governing board of the utility that specifically addresses SWP?
2. Is the SWP vision (mission statement or policy) distributed and understood throughout the organization?
3. Does your mission statement recognize that SWP is one of the multiple barriers for drinking water production?
4. Does the utility mission statement include commitment of, or intention to commit, sufficient resources?
5. Have key stakeholders been identified and involved in development of the mission statement (e.g., was there a process in which outside entities had the opportunity to comment)?
6. Is there a process for regular/periodic review of the SWP vision and when was the SWP vision last reviewed?
7. Optional - Is the SWP vision available to the public (in Consumer Confidence Report, Annual Report, other Outreach Materials, and/or the utility's Web site)?



Characterization Questions

1. Have the SWP area(s) and area(s) of concern been delineated?
 - Using geological tools or estimated time of travel?
2. Do water quality data exist for the source water at intakes or wells?
3. Do inventories, records or knowledge of actual and potential contaminant sources, and associated land-use information exist?
4. Is the information from Question 3 in a useable format?
5. Have existing management activities and pollution control practices in the SWP area been evaluated?
6. Has a source water susceptibility analysis been conducted?
7. Are relevant personnel aware of applicable federal/state/provincial/local regulations?
8. Have source water area stakeholders, landowners, their roles, and their initiatives been identified?



Characterization Questions (continue)

- 9a. Has the utility adequately identified the key security threats to the source water?
- 9b. Does the utility have written plans describing the expected response of personnel in the event of an emergency incident (including sabotage and accident)?
- 9c. Does the emergency plan include components for both protecting people and protecting the source water?
- 10. Does the utility have documentation that describes emergency response plans and provides specific directions to personnel in the event of an emergency?
- 11. Does the utility have documentation of health and safety procedures that are designed to safeguard the employees and visitors engaged in operations activities pertaining to watershed management?
- 12. Is there a process for periodic updating of the source protection area?



Program Goal Questions

1. Program Goals
 - a. Does the utility have written goals for the SWP program?
 - b. Are the goals prioritized?
 - c. Has a specific timetable been developed to meet the goals?
2. Do these goals directly and adequately address the primary existing and future threats to source water quality that were identified in the source water/SWP area characterization and susceptibility analysis?
3. Do the goals address emerging/unknown contaminants?
4. Do the goals address potential changes in land use and related impacts?
5. Do the goals address other potential future issues for the source water?



Program Goal Questions (continue)

6. Qualitative and Quantitative Measures
 - a. Do the goals have specific qualitative and/or quantitative means of measurement?
 - b. Do the qualitative and/or quantitative dimensions have specific means of measurement?
7. Do the goals meet or exceed existing and future regulations?
8. Stakeholder Involvement
 - a. Are internal stakeholders involved in development of the goals?
 - b. Are external stakeholders involved in development of the goals?
 - c. Do these goals adequately consider customer and other stakeholder expectations?
9. Is there a process for periodic revision and improvement of the goals



Action Plan Questions

- 1a. Does the action plan incorporate the community's vision?
- 1b. Is each of the established SWP goals supported by potential projects and/or activities?

Essential Components

- 2a. Address existing contaminant sources
- 2b. Address sensitive areas
- 2c. Consider effectiveness of actions (e.g., BMPs) for key contaminants
- 2d. Involve stakeholders



Action Plan Questions (continue)

Prioritization and Planning

- 3a. Are potential projects and/or activities prioritized on the basis of relative risk from pollutant sources, buy-in from stakeholders, staff and resource commitment needed, budget and finances, expertise, time commitments needed to accomplish, political support and feasibility, likely effectiveness, and short-term vs. long-term actions?
- 3b. Have work plans been developed for the projects (including scope, budget, required resources, responsibilities, and implementation schedule)?
4. Are funding mechanisms in place to support the various potential projects and/or activities?
5. Is a timetable laid out for implementation of each step of the action plan?
6. Have potential problems and obstacles been identified to the extent feasible?



Action Plan Questions (continue)

7. Have means for measuring the success of the projects been developed?
8. Are there any research efforts to address current and future contamination threats to your source water?
9. Does the action plan contain sufficient flexibility to address future needs that may involve?
10. Does the plan consider future changes in land use and their impacts on water quality? Was a model used to predict future development impacts?
11. Does the plan address potential future point sources and how they would be mitigated?
12. Does the plan address future sources of supply and how they will be protected?
13. Is there a process for periodic revision and improvement of the action plan?



Action Plan – Contingency Planning Questions

Contingency Planning

- 14a. Has the ability of the water system to function with the loss of the largest source of supply been assessed?
- Water system's maximum capacity identified
 - Capacity re-evaluated to consider if the largest supply source were to be lost
 - The most vulnerable sources of supply identified (using vulnerability/susceptibility analysis)
- 14b. Has a plan for alternate water supply been developed?
- Short-term and Long-term supplies identified
 - Emergency supplies considered, including increasing production from existing supplies, conservation measures, inter-ties with other water supply systems, providing standby treatment facilities, increasing storage
 - Alternative supplies for fire flows considered
- 14c. Has a spill/incident response plan been developed?
- Included emergency responders (fire, police, health dept., etc.) in the plan
 - Included protocols and standard operating procedures (SOPs) for sharing information with the media/public



Implementation Questions

1. Milestones and Achievements
 - a. Are the high-priority projects completed or in process?
 - b. Have project milestones been achieved on time?
 - c. Are projects achieving their objectives as outlined in the action plan?
 - d. Were all components of the plan implemented?
2. Roles and Responsibilities
 - a. Were there changes of responsibilities or roles of utility personnel during implementation?
 - b. Was there continued support or participation throughout plan implementation by stakeholder partners?
3. If obstacles to successful implementation of the action plan have been encountered, have means for surmounting those obstacles or other means of reaching the objectives been identified?
4. Were there any funding changes during implementation of the project?
5. Is there a process for contingency planning and periodic revision and improvement of the program implementation tasks?



Program Evaluation and Revision Questions

1. Is there an established process for evaluating the SWP program and its elements? Revising the program on the basis of evaluation results? Process to identify and assess emerging issues and incorporate them in the program?
2. Has the evaluation team been named?
3. Is there a timeline and/or other criteria for the evaluation?
4. Have benchmarks been established (for land use, water quality monitoring, habitat monitoring, and stakeholder communication)?
5. Is the SWP program evaluation and modification reported to internal and external stakeholder and the governing board?



Questions



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**“An ounce of prevention is
worth a pound of cure”**

- Ben Franklin

