

USING THE SOURCE WATER PROTECTION OPERATIONAL GUIDE TO AWWA STANDARD G300

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Acknowledgement:

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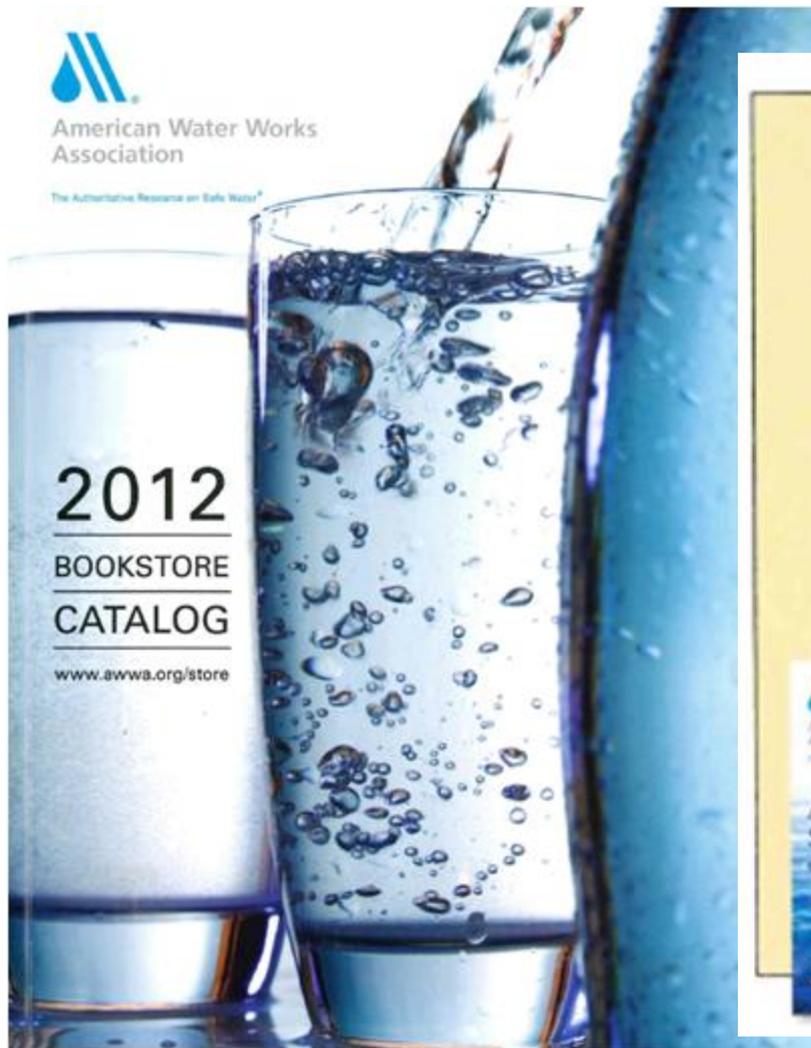
Passaic Valley Water Commission

Learning Goals

You will:

- Be able to list the six essential components of a Source Water Protection Program (SWPP)
- Be able to describe the key elements and challenges to implementing a comprehensive SWPP

AWWA Standards for Products and Practices



AWWA Utility Management Standards (G Series)

- G100, Water Treatment Plant Operations & Management
- G200, Distribution Systems Operations and Management
- G300, Source Water Protection
- G400, Utility Management
- G410, Business Practices for Operation and Management
- G420, Communications and Customer Relations
- G430, Security Practices for Operations and Management
- G440, Emergency Preparedness Practices

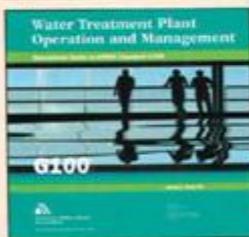
AWWA Utility Management Standards (G Series)

DESIGNATION	NAME	NO.	MEMBER LIST	
UTILITY MANAGEMENT				
G100-11 Revised	Water Treatment Plant Operation and Management	47100	\$39	\$62
G200-09	Distribution Systems Operation and Management	47200	\$39	\$62
G300-07	Source Water Protection	47300	\$39	\$62
G400-09	Utility Management System	47400	\$39	\$62
G410-09	Business Practices for Operation and Management	47410	\$45	\$72
G420-09	Communications and Customer Relations	47420	\$39	\$62
G430-09	Security Practices for Operation and Management	47430	\$39	\$62
NEW G440-11	Emergency Preparedness Practices	47440	\$39	\$62
J100-10*	Risk Analysis and Management for Critical Asset Protection (RAMCAP) Risk and Resilience Management of Water and Wastewater Systems	40100	\$104	\$135

*Not included in AWWA Standards set

Operational Guides for AWWA Management Standards

Operational Guides help utility managers understand the purposes and functions of AWWA management standards and help them implement and incorporate the standards into everyday utility operations. The guides include practical examples, checklists, and questions to ask that help a utility monitor its progress in implementing the recommended practices set forth in AWWA Management Standards.



New!

Operational Guide to AWWA Standard G100, Water Treatment Plant Operation and Management

Sarah C. Clark

Published by AWWA, 2011, softcover, 125 pp. ISBN 978-1-58321-853-2

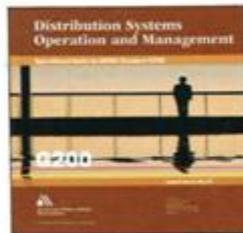
No. 20643

Member \$54 | Nonmember \$80

G100 Standard and Operational Guide Set

No. G100SET

Member \$85 | Nonmember \$125



Operational Guide to AWWA Standard G200, Distribution Systems Operation and Management

Karwal Oberoi, ME, PE

Published by AWWA, 2009, softcover, 121 pp. ISBN 978-1-58321-734-4

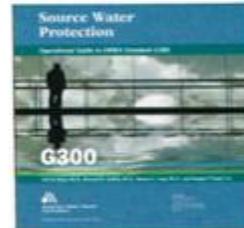
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G200 Standard and Operational Guide Set

No. G200SET

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Operational Guide to AWWA Standard G300, Source Water Protection

Chi Ho Shum, Richard W. Gullick, Sharon C. Long, Pamela P. Kenel

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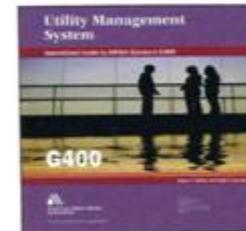
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G300 Standard and Operational Guide Set

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Operational Guide to AWWA Standard G400, Utility Management System

James F. Ginley, Todd A. Humphray

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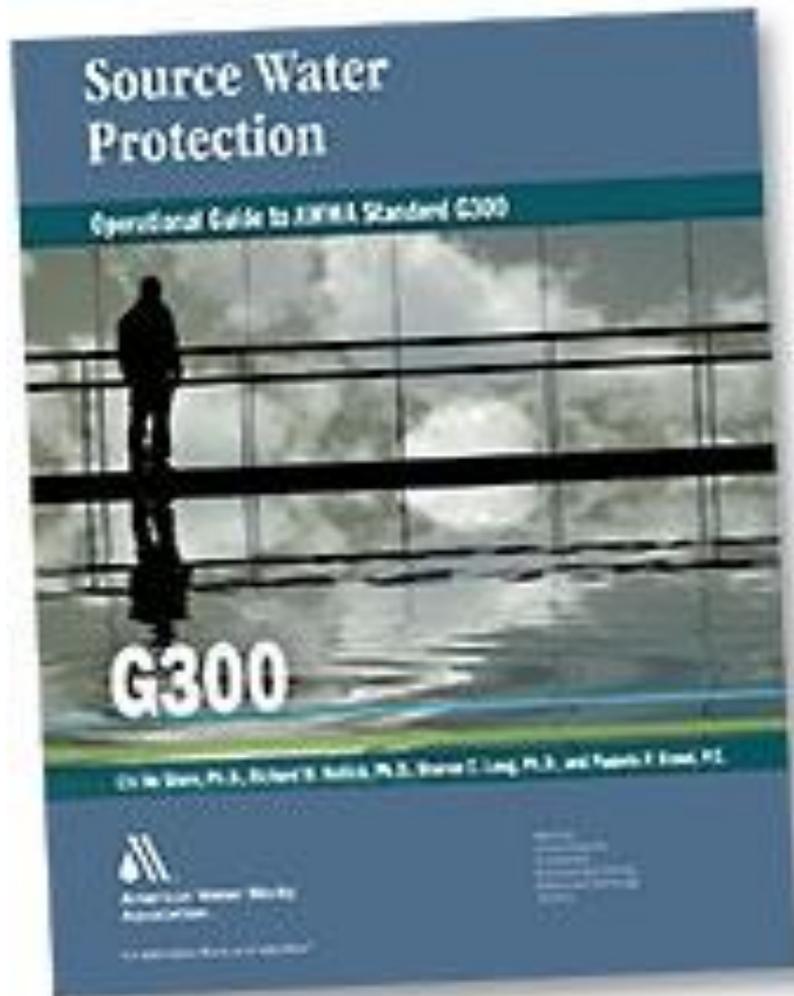
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G400 Standard and Operational Guide Set

No. G400SET

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AWWA SWP Standard Operational Guide



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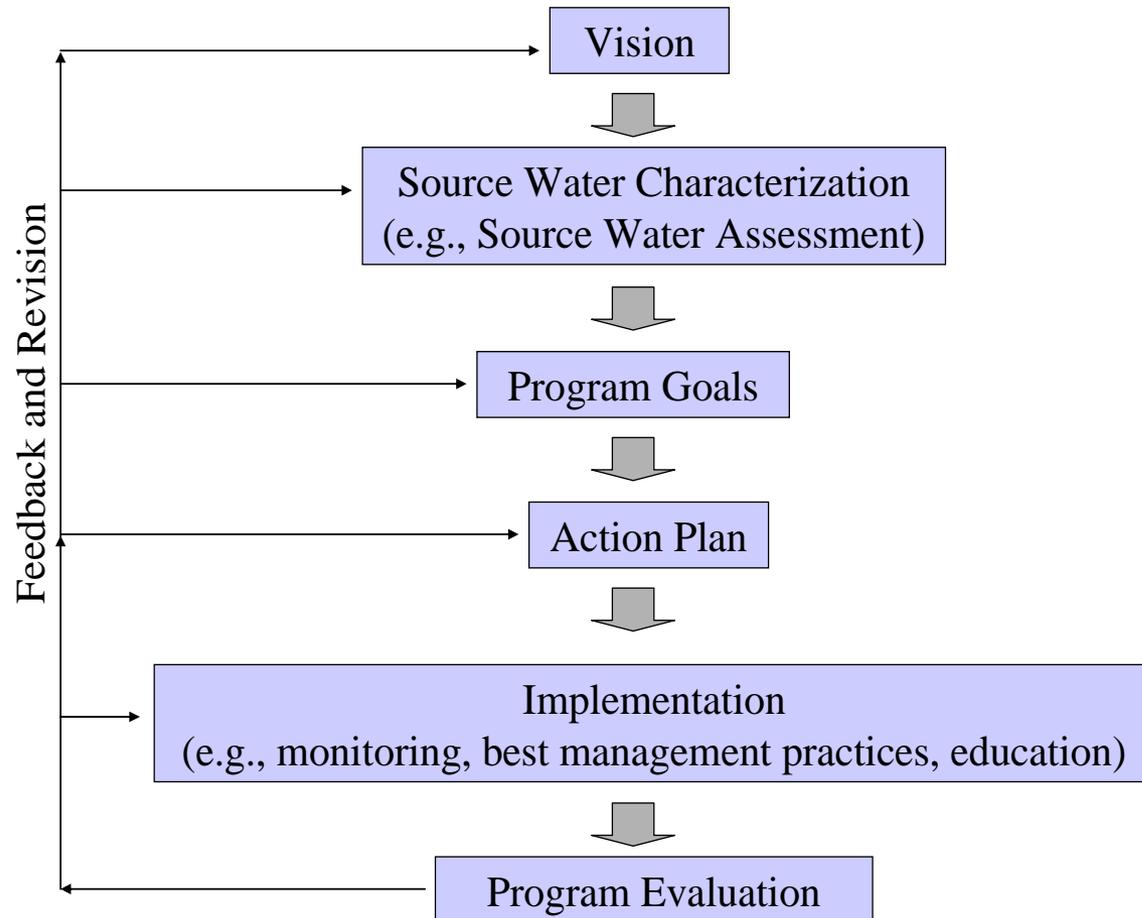
Source Water Protection

- **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 of the G300 standard that successful programs share several common fundamental elements

Essential Elements of Source Water Protection



Concept of SWP Standard

Six basic elements:

- 1) Vision
- 2) Characterization
- 3) Goals
- 4) Plan
- 5) Implementation
- 6) Evaluation

- 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. The vision may be articulated in a mission statement or policy of the governing body of the utility, and is a statement of the utility's commitment to SWP. This written vision helps to align priorities and resources for the SWP program.

Vision Worksheet 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)?

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”.

An Example of a SWP Vision (Philadelphia, PA)

- Adopted for itself the role of the region's "watershed champion"
- *Office of Watersheds* – combines programs for Combined Sewer Overflow, Storm Water Management, and Source Water Protection
- The vision and mission are supported by a commitment from the top of the organization for substantial resources (i.e., Office of Watersheds staff and budget) to work toward achieving those objectives

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



Additional G-300 Components for Source Water Characterization

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

Note: Being updated and moved to Action Plan

Characterization Worksheet

Questions

1. Have the SWP area(s) and area(s) of concern been delineated?
 - Using geological tools?
 - 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?

More Characterization Questions

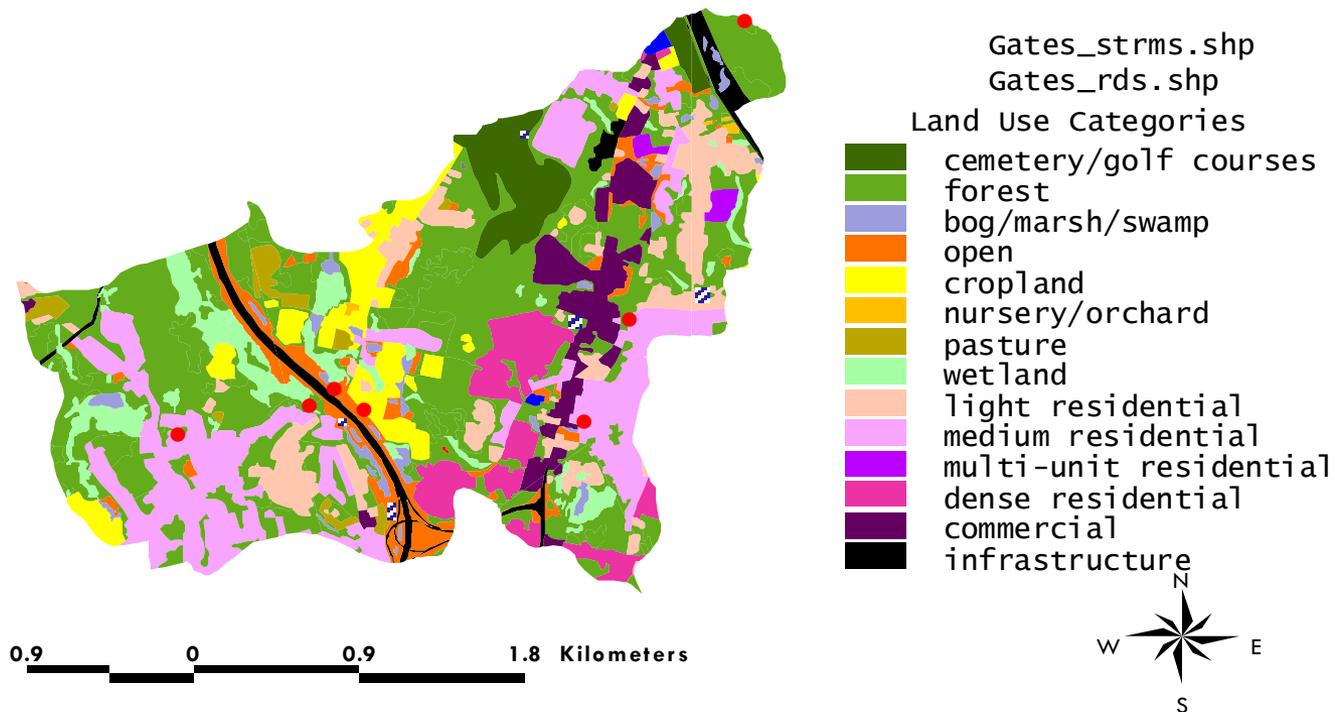
- 9a. Has the utility adequately identified the key security threats to the source water?
- 9b. Does the utility have written plans describing the expected response of personnel in the event of an emergency incident (including sabotage and accident)?
- 9c. Does the emergency plan include components for 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?

Characterization Activities

- Delineating the Source Area of Concern
- Water Quality Information
- Contaminant Source Inventory Data
- Land Use Analysis
- Physical Barrier Effectiveness (PBE) Determination
- Intake Structure
- Filling Information Gaps and Needs
- Analysis of Vulnerability/Susceptibility

Example: Source Area Delineation and Land Use Analysis

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



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

Program Goals

Goals and objectives need to be formulated

- to **guide** the SWP program and its specific elements
- goals should be **targets** developed in response to specific problem areas identified through the characterization and risk assessment processes
- goals should address each of the **drivers** motivating the SWP program including the SWP vision
- goals may address both current and potential future issues
- goals should be **prioritized** to reflect the concerns of greatest importance, and ideally should specify temporal and qualitative and/or quantitative dimensions (e.g., specific 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, biological diversity, socioeconomic and political equity, and balances with competing considerations
- Should be prioritized to reflect the concerns of greatest importance as well as areas and projects where success is most likely

Program Goal Worksheet 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?

More Program Goal Questions

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

Program Goal Example

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

1. 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
2. Create a long-term, sustainable fund to support restoration, protection, and education projects in the Schuylkill River watershed

Program Goal Example (2)

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

Action Plan Worksheet 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

More Action Plan Questions

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, & implementation schedule)?

More Action Plan Questions

Prioritization and Planning

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 (cont.)

7. Have means for measuring the success of the projects been developed (e.g., identified metrics for monitoring program effectiveness)?
8. Are there any research efforts to address current and future contamination threats to your source water (including past contamination events)?
9. Does the action plan contain sufficient flexibility to address future needs that may involve: Emerging microbes, nutrients, taste and odor, conservation, water quantity emergencies, long-term water quantity, operational/treatment issues, and newly-recognized organic compounds (e.g., PPCPs)?
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?
(applies to groundwater supplies, groundwater under the direct influence of surface water [GWUDI], and new intakes on the same watershed.)
13. Is there a process for periodic revision and improvement of the action plan?

Action Plan – Contingency Planning

Worksheet Questions

Contingency Planning

1 4a. 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)

1 4b. Has a plan for alternate water supply been developed?

Short-term supplies identified

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

1 4c. Has a spill/incident response plan been developed?

Included emergency responders (fire dept., police, health agency, etc.) in the plan

Included protocols and standard operating procedures (SOPs) for sharing information with the media/public

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 Worksheet 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?

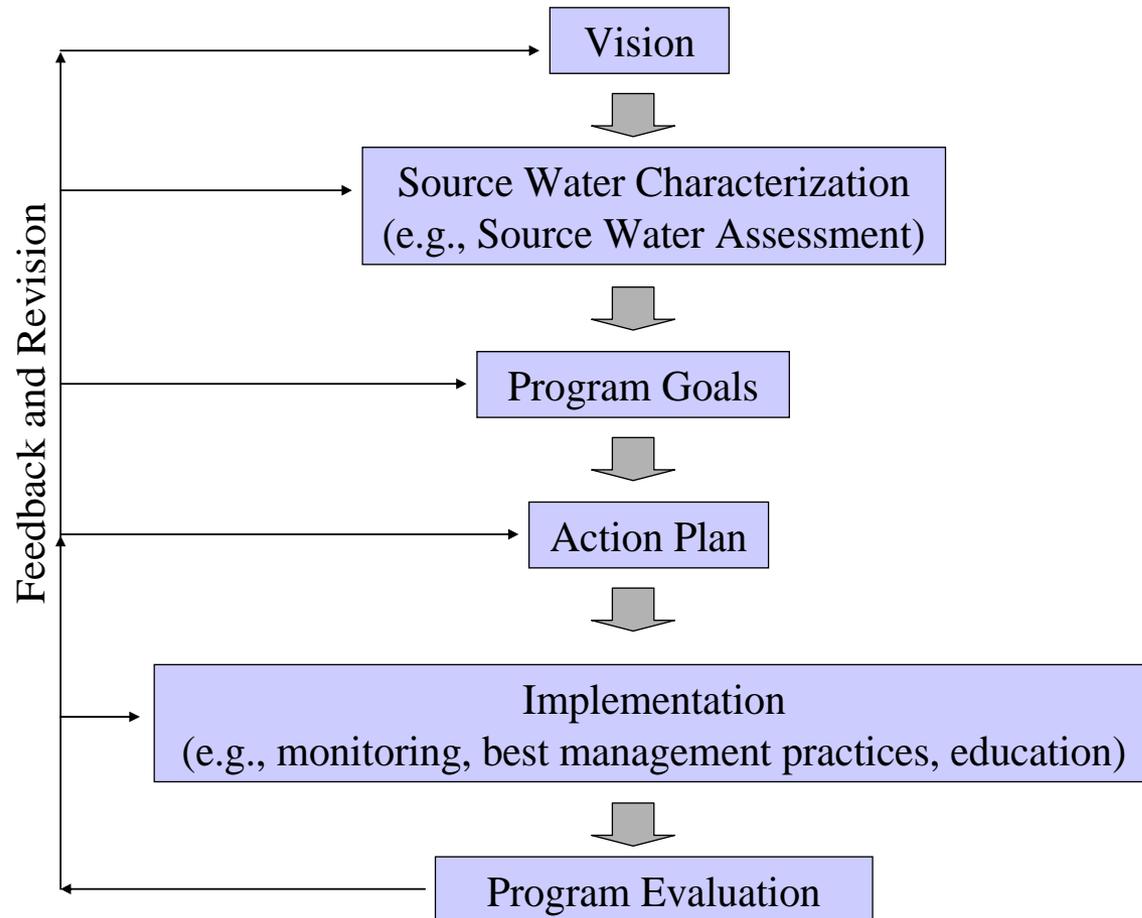
5. Is there a process for contingency planning and periodic revision and improvement of the program implementation tasks?

Program Evaluation

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

Essential Elements of Source Water Protection



Questions?

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CADMUS



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

- Ben Franklin

