

Source Water Protection for Public Water Supplies - Developing a Vision and Roadmap for Lake Management

Chi Ho Sham, Ph.D.
The Cadmus Group, Inc.

2013 NYSFOLA Annual Conference - May 3, 2013-
Hamilton, NY

Source Water Protection

- Source Water Protection program objectives are to maintain, safeguard, and improve the quality of a given source water.
- Potential incentives include:
 - greater public health protection, especially for sensitive subpopulations, and potentially reducing illnesses and mortality;
 - economic benefits such as reduced healthcare costs and reduced loss in productivity;
 - a way to respond to uncertainties presented by a growing number of unknown or unregulated microbiological and chemical contaminants;
 - avoided costs of treating, monitoring, and remediating contamination; and
 - a greater likelihood of complying with existing and future drinking water regulations.

Source Water Protection

- Source Water Protection programs provide a way to assess and prevent contamination.
- To minimize the effects of chemical and microbiological contaminants in lakes, Source Water Protection programs should address:
 - stormwater runoff that may contain contaminants such as microorganisms, nutrients, heavy metals, organic chemicals, and sediment;
 - treated and untreated municipal and industrial wastewater discharges;
 - combined and sanitary sewer overflows;
 - septic systems;
 - animal waste from livestock, pets, and wildlife;
 - agricultural, commercial, and residential use of fertilizers and pesticides;
 - mining and oil and gas extraction; and
 - solid waste and hazardous-waste disposal sites.

Source Water Protection

- In 2008, Water Research Foundation sponsored Project # 4176 to provide a framework to develop and promote source water protection among U.S. water utilities
- Project's Goal:
 - To identify critical elements of a unified source water protection roadmap and define steps that should be taken to set this roadmap in motion

Participating Utilities



Water Utility Interviews

- 60 community water systems interviewed (30 surface water, 30 ground water)
- Broad spectrum of sizes and locations across U.S.
- All interviews used same form

Water Utility Interviews

12 of 30 surface water utility respondents indicated they had a SWP program, although it may not be formalized or fully developed.

29 of 30 ground water utilities have a SWP program or wellhead protection program (24 have wellhead protection programs).

Reasons for NOT having SWP program (18 surface water systems)

- Utility has no authority to do anything to protect source water (9 utilities)
- Resources are too restricted to implement a SWP program (9 utilities)
 - time and funding cited
- Utility believes someone else is responsible for SWP (7 utilities)
 - 3 said government agencies had control over lakes/reservoirs they are using
- Threat to source water is low (8 utilities)
- Source is too large to implement a SWP program (4 utilities)
- SWP program is not required so utility does not feel it's necessary (3 utilities)

AWWA Standard for Source Water Protection



ANSI/AWWA G300-07
(First Edition)

The Authoritative Resource on Safe Water®

AWWA Standard

Source Water Protection

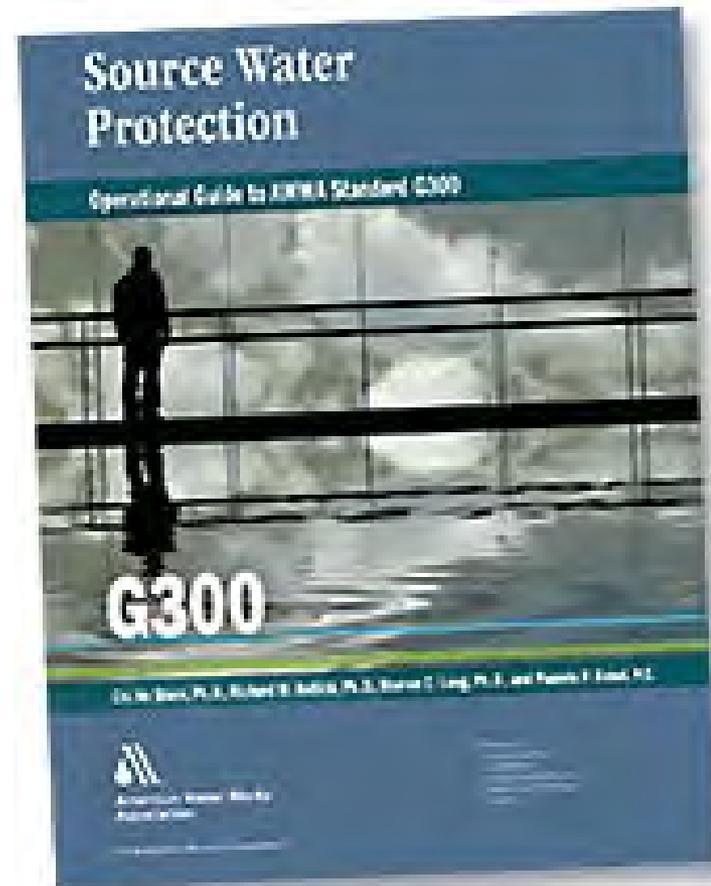


Effective Date: July 1, 2007
This edition approved: Jan. 21, 2007
Approved by American National Standards Institute: April 20, 2007

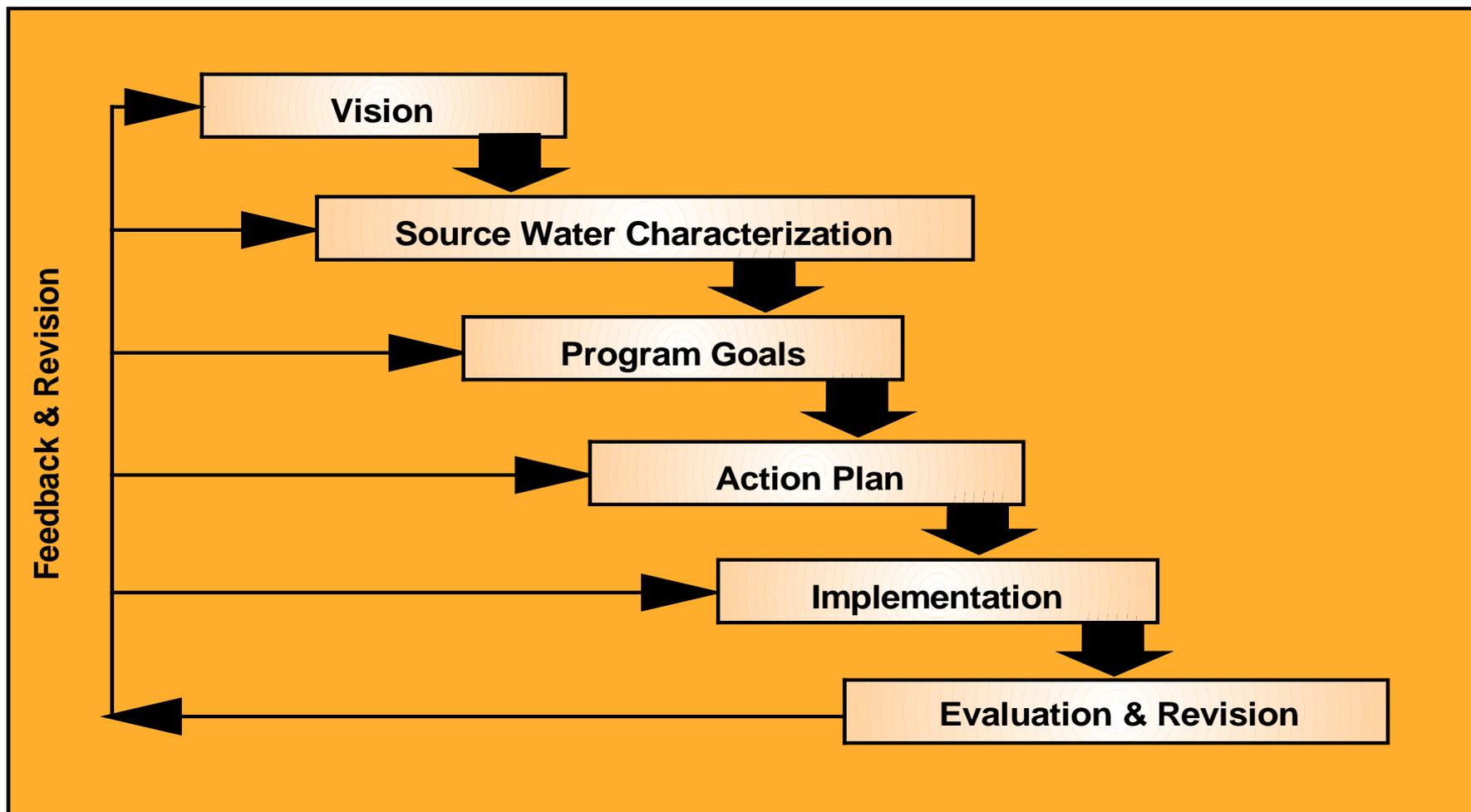
666 West Quincy Avenue
Denver, CO 80225-3096
T 800.926.7337
www.awwa.org

Advocacy
Communications
Conferences
Education and Training
Science and Technology
Sections

Copyright © 2007 American Water Works Association. All Rights Reserved.



Components of a Successful Source Water Protection Program



From AWWA Standard G300

Utility Case Studies

Utility	City, State	Source of Supply	Population Served
Beaver Water District	Lowell, AR	Surface - lake	250,000
Central Arkansas Water	Little Rock, AR	Surface - lakes	398,000
Greater Cincinnati Water Works	Cincinnati, OH	Ground water and surface (river)	314,000
Columbus Division of Power and Water	Columbus, OH	Surface - river, reservoirs	1,083,100
East Bay Municipal Utility District (EBMUD)	Oakland, CA	Surface - reservoirs	1,200,000
East Greenville Borough Water District	East Greenville, PA	Surface - creek/river	3,200
Massachusetts Water Resources Authority (MWRA) and the Massachusetts Department of Conservation	Boston, MA	Surface - reservoirs	2,200,000
Meredith Water Department	Meredith, NH	Surface - reservoir	1,367
New York City Department of Environmental Protection	New York, NY	Surface - reservoirs	8,000,000
Regional Water Authority	New Haven, CT	Primarily surface water	400,000
Salt Lake City Department of Public Utilities	Salt Lake City, UT	Surface (rivers) and groundwater	400,000
San Antonio Water System	San Antonio, TX	Groundwater	1,000,000
Washington Aqueduct	Washington, DC	Surface - river	1,000,000

Workshop

- 1½ day workshop held in Boulder, CO March 2010
- Most workshop participants represented water utilities
- Patrick Field, facilitator, CBI
- Group had been prepped with webinar and homework

Additional Workshop Participants

- Elaine Dilley, City of Redmond, WA
- John Duggan, Colorado Dept. of Public Health and Environment (representing ASDWA)
- Mike Muse, U.S. EPA
- Bill O'Connell, NRWA

Products of Workshop

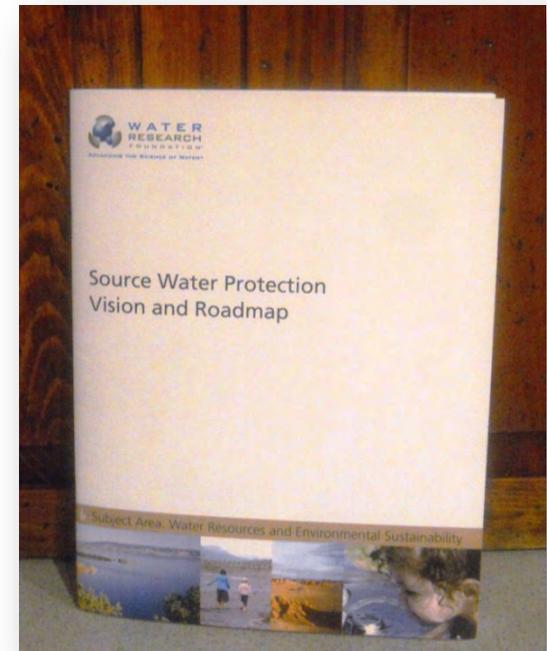
- Articulate a SWP vision for U.S. water utilities
- Define goals for attaining vision
- Identify benchmarks reflecting attainment of goals
- Develop strategies for achieving benchmarks
- Organize into a roadmap for SWP for U.S. utilities

Project 4176 Reports

- Literature/background review
- Water utility interviews
- Utility case studies
- Workshop outcomes

4176a Full Report (Electronic copy only)

4176b Shorter Version with Roadmap



<http://www.waterrf.org/Pages/Projects.aspx?PID=4176>

Source Water Protection Vision:

“Source water protection is essential for providing a reliable supply of high-quality drinking water. By 2025, every public community water supply will be protected by an active source water protection program.”



Roadmap Themes

- Raise Awareness
- Enhance Coordination
- Provide Support
- Increase Recognition



Raise Awareness

Need to *raise awareness* of importance and value of source water protection. Greater awareness is needed

- *By utilities*, of the role SWP plays in the multi-barrier approach to providing reliable, high quality water at reasonable rates
- *By utilities and their management*, of the value of SWP
- *By consumers*, of the benefits and value of SWP
- *By stakeholders*, of the importance of protecting drinking water sources and the priority that should be given to drinking water concerns in SWP

Enhance Coordination

Programs, efforts, and regulations affecting SWP can be conflicting, redundant, or lacking in focus. Need to *enhance coordination*

- *Overall (across all relevant operational and stakeholder groups), so that SWP efforts and programs are better integrated and work together synergistically*
- *Among CWA and SDWA regulators, both at the state and federal levels, for more effective implementation of existing CWA regulations so that drinking water interests are more immediately and completely addressed*

Provide Support

There is a need for greater *support*. Specifically, water utilities would benefit most from support provided by

- *Experienced water industry peers*, for fellow drinking water professionals trying to plan and implement source water protection programs; and
- *State and federal funding agencies*, so that source water protection needs are sufficiently addressed (for high quality water sources as well as impaired water bodies).
- *Municipal officials*, who can influence public support of regulatory and financial measures to implement source water protection; and
- *Customers*, through water rates.

Increase Recognition

Issues and efforts related to SWP should be acknowledged more publicly. Successful efforts should be praised more frequently. Regulatory inconsistencies hampering SWP should also be addressed. In these ways, there should be *increased recognition*

- *By the public and the drinking water community, of successful SWP efforts made by water utilities*
- *By state and federal regulators, of inconsistencies and shortcomings of existing regulations that should more effectively ensure the protection of drinking water sources.*

Roadmap Themes

- Raise Awareness
- Enhance Coordination
- Provide Support
- Increase Recognition



Enhance Coordination

Obstacle: The existing regulatory framework (federal, state and local) is not effectively protecting water supplies from current and future threats.

Action:

- 1. Fix gaps to improve integration of CWA regulation and source water protection**
- 2. Identify ways the CWA can do a better job at protecting high quality drinking water sources.**
- 3. The water industry needs to leverage CWA and other state and federal regulations and programs more effectively to improve protection of drinking water sources.**
- 4. There has been a failure to build upon Source Water Assessments completed in the early 2000's. A plan needs to be developed for how to move from assessments to protection.**

Enhance Coordination

Obstacle: *There is no one to ordinate or lead the charge.*

Action:

- 1. Create a Source Water Protection Coordinator position**

Roadmap Themes

- Raise Awareness
- Enhance Coordination
- Provide Support
- Increase Recognition



Raise Awareness

Obstacle: *Among water utilities, there is often a lack of awareness of the need for action regarding source water protection.*

Action:

1. Increase the use of regional and statewide organization for increasing awareness of source water protection for water utilities.
2. Perform knowledge gap analyses for individual water utilities and stakeholder groups.

Raise Awareness

Obstacle: There is a broad lack of awareness of the importance of source water protection among stakeholders outside of the water utilities.

Action:

- 1. Develop a system for raising awareness, providing outreach, and promoting education to key decision-makers regarding the importance and benefits of source water protection.***
- 2. Work with local schools on educational programs.***
- 3. A more proactive approach should be taken with the media.***

Raise Awareness

Obstacle: It is difficult to ascribe a value to source water protection.

Action:

- 1. Recognize and educate utility management on approaches to quantifying the monetary benefits of source water protection.**
- 2. Utilities can develop descriptions of the potential impacts and costs of not undertaking source water protection (e.g., cost of replacing a contaminated groundwater supply).**
- 3. Re-package available information on the “true value of water”.**

Roadmap Themes

- Raise Awareness
- Enhance Coordination
- Provide Support
- Increase Recognition



Provide Support

Obstacle: *There is no organized mechanism for water utilities to teach and support one another in their source water protection efforts.*

Action:

1. Create a two-part voluntary, on-site, individual source water protection education and training program for water utilities composed of a brief mentoring program and a more comprehensive training and audit program.

Provide Support

Obstacle: Water utility personnel do not sufficiently understand the potential impacts of several contaminants/actions on source water quality and how to protect source water to minimize those impacts.

Action:

- 1. USEPA, State, and ASDWA, AWWA, NRWA, NRCS and other appropriate organizations should provide more information, education and guidance on how to manage watersheds and aquifers regarding various contaminants.**

Roadmap Themes - *Example*

- Raise Awareness
- Enhance Coordination
- Provide Support
- Increase Recognition



Increase Recognition

Obstacle: *There is insufficient acknowledgement and recognition of the efforts being made by water utilities and their partners who are actively pursuing source water protection.*

Action:

1. A plan should be developed for an award program to recognize and acknowledge successful, high-quality source water protection programs.

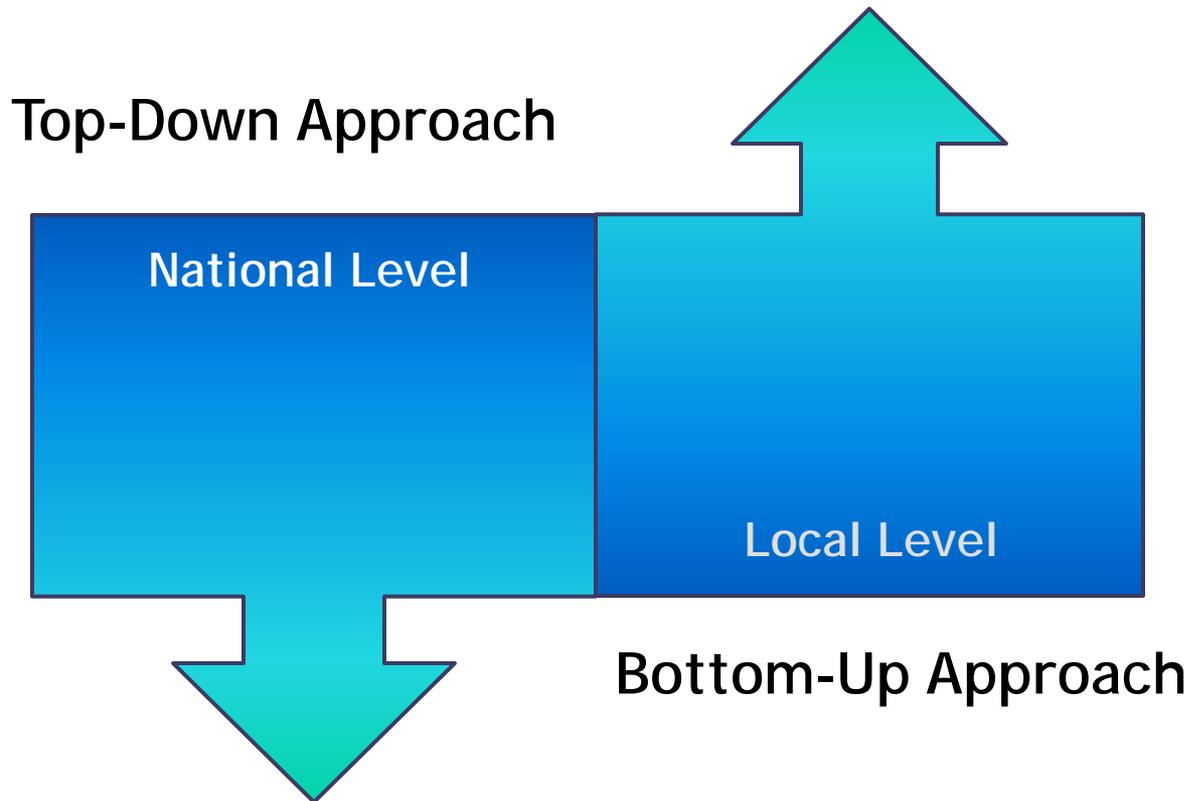
Increase Recognition

Obstacle: There is no consistent recognition of source water protection as an important element in regional/state/local planning and land management decision-making.

Action:

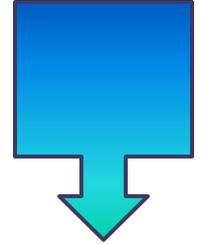
- 1. On the National Scale: Obtain nationwide awareness among key land use planning and management organizations.***
- 2. On a Watershed/Aquifer Scale: Develop watershed/aquifer councils of governments and/or partner with non-governmental organizations to facilitate natural-system based land and source water planning efforts.***
- 3. On the Interstate Scale: Develop interstate and trans-boundary waterway commissions to facilitate land and source water protection across state boundaries.***
- 4. Water utilities should encourage local and state legislative bodies to pass a resolution recognizing that source water protection is important.***

Recommendations for How to Proceed



Recommendations for How to Proceed

Top-Down Approach

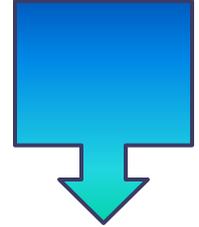


At the national level

- Develop system for providing awareness, outreach and education to key decision-makers and the general public (including schools) as to importance and values/benefits of SWP
- Fix gaps to improve integration of CWA regulation and source water protection
- Create a national source water protection coordination organization

Recommendations for How to Proceed

Top-Down Approach

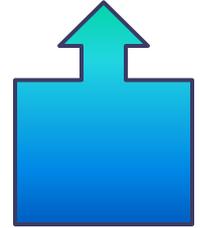


At the national level (continued)

- Achieve nationwide recognition of SWP efforts among key land use planning and management organizations
- U.S. EPA, states and ASDWA, AWWA, NRWA, NRCS and other appropriate organizations should provide more information, education and guidance on how to manage watersheds and aquifers regarding emerging issues and other SWP issues specific to drinking water
- Develop interstate and trans-boundary waterway commissions to facilitate SWP across state boundaries

Recommendations for How to Proceed

Bottom-Up Approach

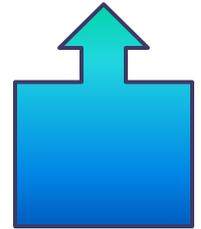


At the local level

- Create an on-site, individual SWP mentoring program for water utilities
- Update and build upon existing SW assessments to move forward to protection
- Leverage current CWA and other state and federal regulations and programs more effectively

Recommendations for How to Proceed

Bottom-Up Approach



At the local level (continued)

- Water utilities should encourage local and state legislative bodies to pass resolutions recognizing that SWP is important
- Develop watershed/aquifer councils of governments and/or partner with NGOs as watershed associations to facilitate natural system-based land and source water planning efforts

Various Efforts on SWP

- AWWA - G300 Standard for SWP (with guidebook)
- AWWA - Survey of large water systems regarding SWP
- AWWA - Exemplary SWP Awards
- EFCN - SWP IQ
- NALMS - workshop of SWP and special sessions
- NYSDEC - SWP workshops
- Source Water Collaborative - pilot projects (Salmon Falls, ME)
- Source Water Collaborative - working with USDA
- Source Water Collaborative - CWA and SDWA integration
- State Source Water Collaborative - NC SWC
- USFS - Forest to Faucet
- WaterRF - TMDL and SWP

Questions?

Chi Ho Sham

Phone: 617-673-7156

Email: ChiHo.Sham@cadmusgroup.com