

WQS, TMDLs and Drinking Water Utilities



Potomac DWSP Partnership
Information Session

July 21, 2010

References

- Water Research Foundation
 - Project 2944: Total Maximum Daily Loads (TMDLs) and Drinking Water Utilities (2005)
 - Contractor: Perot Systems / Limno-Tech, Inc.
 - Project 4007: Drinking Water Source Protection Through Effective Use of TMDL Processes (2009)
 - Contractor: The Cadmus Group

Brief Introduction

- Importance to Water Utilities
- Clean Water Act Basics
- TMDL Process
- CWA/TMDL vs. SDWA/SWAP
- Drinking Water Issues

“Although the SDWA and CWA programs are typically implemented independently of one another, activities overlap under the two programs. Water utilities should take advantage of this overlap to get involved , especially in times of resource constraints.....”

Water Research Foundation Project 4007 (Cadmus, 2009)

“There is a growing recognition that the management of drinking water systems and the development of TMDLs share some common goals, including addressing the quality and protection of water sources. In principle, it seems that the need for drinking water utilities to increase watershed protection is being answered by the development of TMDLs. In practice, however, efforts made by drinking water utilities and those made by watershed managers are often not in sync.”

Bottom Line

- Source Protection:
 - Controlling pollutants at the source is part of the “multi-barrier” approach to public health protection
 - The better the source, the lower the treatment costs
 - Lower taste and odor related customer inquiries
- Why the TMDL?
 - Water bodies are multiple uses
 - Pollutant sources are (often) the same
 - Leverage: technical requirements, funding mechanisms, public participation process

The Clean Water Act

- Passed 1972, last amended 1987
- Objective of CWA:
 - To restore and maintain the chemical, physical, and biological integrity of the nation's waters.
- Established Goal:
 - Achieve Water Quality which provided for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water...
- “Fishable and Swimmable” not “Drinkable”

Four Core Precepts

- No right to pollute
- Permits required,
non-compliance penalized
- Minimum WW treatment requirements
(301: TBELs, BAT, BCT...)
- Higher WW treatment to meet WQ Standards
(302: WQ BELs)

Commonly referenced CWA sections

- 101(a) CWA goals and policies
- 106 Pollution control program grants
- 301(b) Effluent limitations
- 303(c) WQS and implementation plans
- 303(d) TMDL
- 305(b) Water quality assessments
- 304(a) Ambient water quality criteria
- 306 National standards and performance
- 319 State NPS management program
- 402 NPDES

Water Quality Standards (303)

- State responsibility, EPA approval
(varies from state to state)
- Use, Criteria, & Anti-Degradation Policy
- Triennial Review
- Use Attainability Analysis

**Let's look at the WQS Criteria a little
more....**

Narrative Criteria: 3 Categories

- Toxicological:
 - No toxic compounds in toxic amounts
- Ecological
 - Nutrients not present in amounts harmful ...
- Aesthetics:
 - Free of oils causing sheens, floatables, odor...

Clean Water Act WQ Standards

Numeric Criteria

- Established to protect uses
- Established using science & policy
- Types/Basis
 - Aquatic life
 - Human health
 - Wildlife

Clean Water Act WQ Standards

Human Health Criteria

- Swimming/Recreation
- Water consumption
- Fish consumption

Clean Water Act TMDL Requirements

- As enacted in 1972, 303(d) of the CWA requires States to:
 - Identify waters not meeting State WQ standards - 303(d) list
 - Set priorities for TMDL development
 - Develop a TMDL for each pollutant for each listed water
- EPA to approve or disapprove State submissions, and if disapproved, to act in lieu of State
- TMDL = “pollution diet”

Safe Drinking Water Act

- Focus public health not water quality
- 1974 with 1996 amendments
- Initial focus on water at the tap not water supply
- Elements discussed herein
 - MCLs: Maximum Contaminant Levels
 - Source Water Assessment Program
 - Enhanced Surface Water Treatment Rule

The Safe Drinking Water Act a Public Health Law

- Standards designed to protect human health
- Good protection from chemical, microbial contaminants
- MCL standards are after treatment
- Uniform standards nationwide
- Variances rare

Water Quality Standards vs. Maximum Contaminant Levels

CWA –
WQ Standards:

- Surface Waters
 - Use, criteria, anti-degradation policy
 - Can be based on aquatic life, public health, or other
 - Emphasis on aquatic life & recreation
-

SDWA - MCLs:

- Drinking Water
 - Measured at tap
 - Public health based only
-

SDWA Supplies:

- ESWT Rule
- Turbidity levels
- Crypto, Giardia, Others

Drinking Water Standards with no CWA Standards

- Many pesticides
- Giardia / Cryptosporidium
- THMs and other disinfection byproducts
- Total Organic Carbon

CWA Standards with no Drinking Water Standards

- Chlorine
- Temperature
- Whole effluent toxicity

Comparison of federal MCLs and CWA Section 304 Criteria (Human Health, Water and Fish)

Examples

	SDWA	CWA
Asbestos	7 MFL	7 MFL
Atrazine	3 ug/L	
Chlorobenzene	100 ug/L	130 ug/L
Selenium	50 ug/L	170 ug/L
1,1-Dichloroethylene	7 ug/L	330 ug/L

TMDL vs. SWAP/SWP

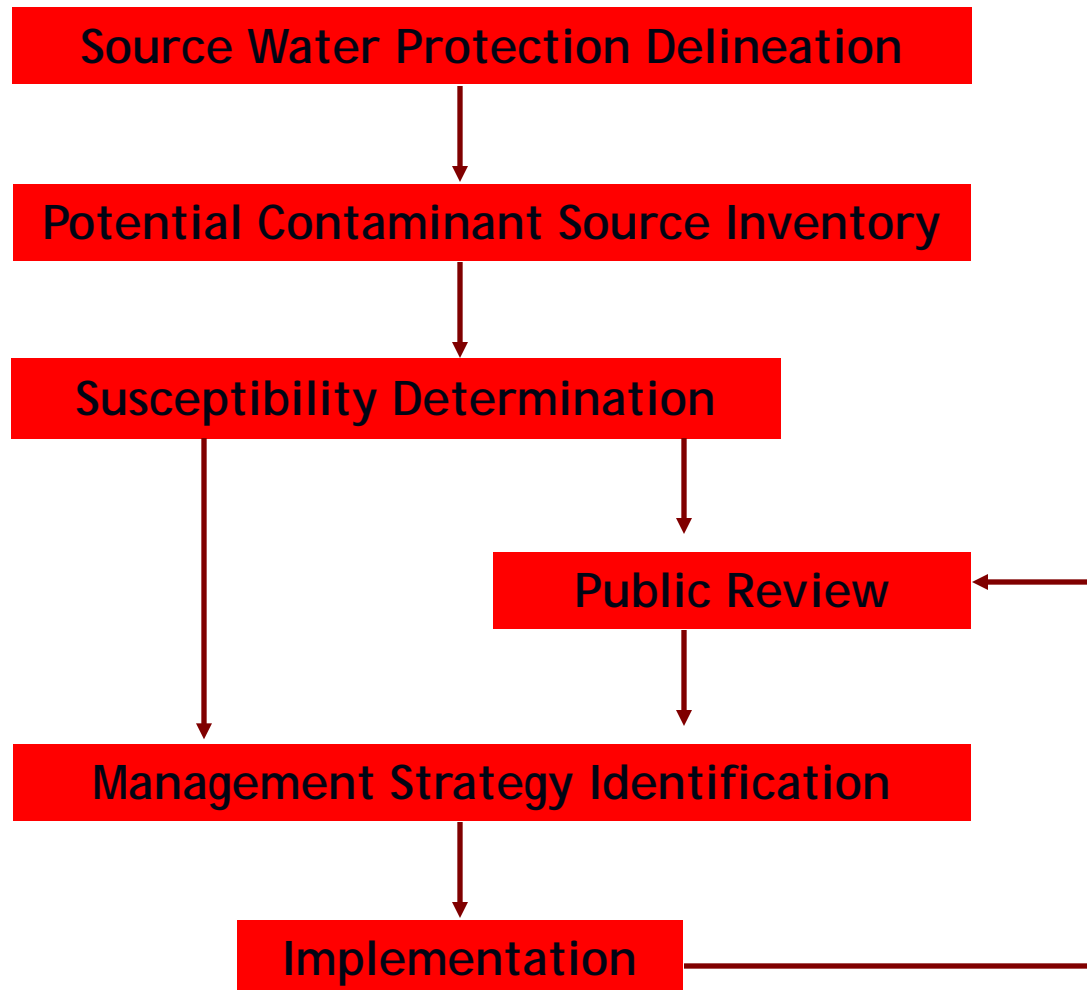
What are the Goals of the programs?

- Source Water Assessment Program (SWAP)
 - Identifying potential contaminant sources, required by SDWA, responsibility of states
- Source Water Protection (SWP)- not reqd.
 - Preventing contamination of surface and ground water supplies
- Total Maximum Daily Load (TMDL)
 - Attaining water quality standards for impaired surface waters

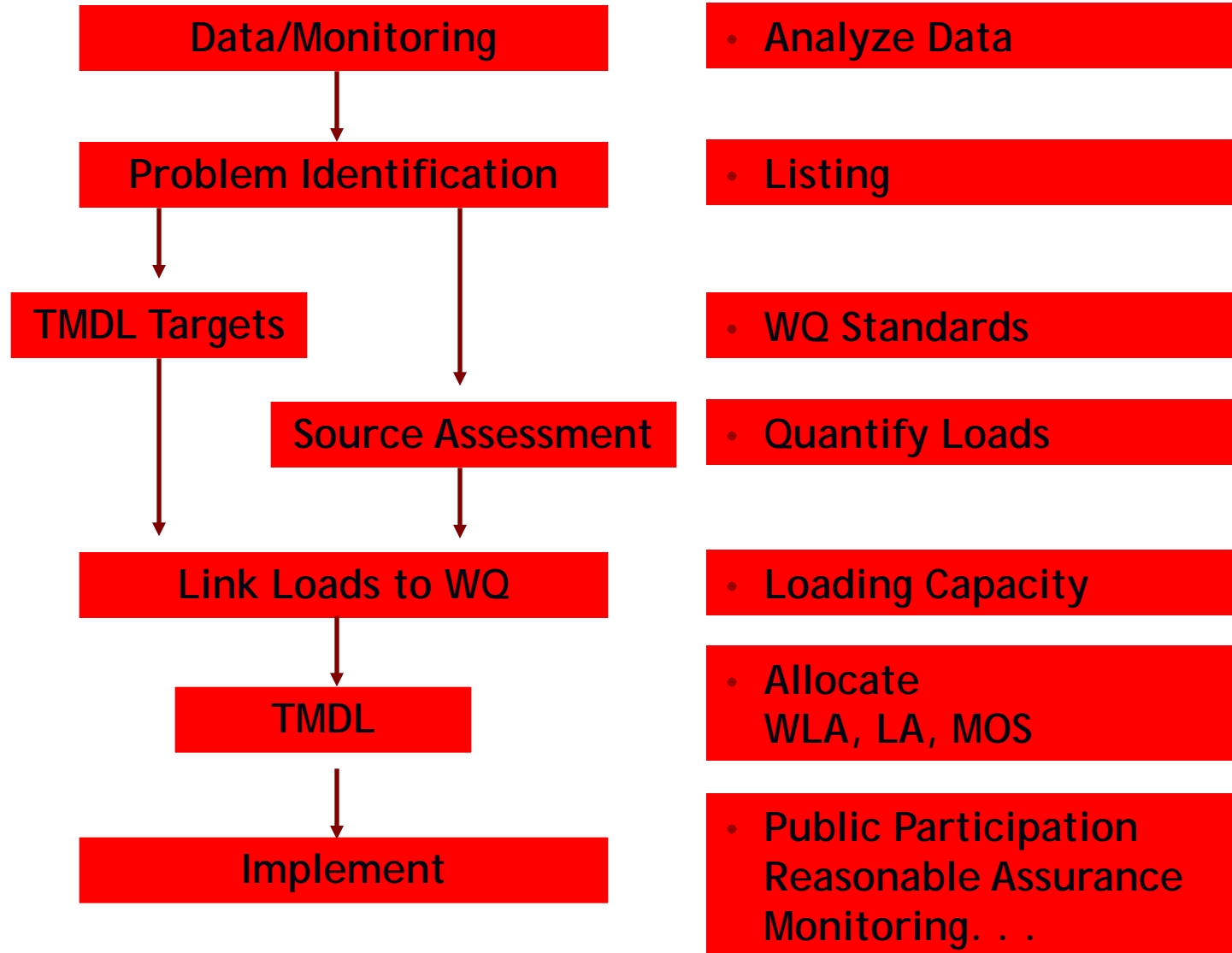
Review of Source Water Assessment and Source Water Protection (SWAP/SWP)

- Analysis of existing and potential threats to public drinking water supply
- Determines susceptibility of drinking water supply to contamination
- Publicly available for use in developing local protection programs
- SDWA amendments required all States to conduct assessments (SWAPs) - Completed
- Source Water Protection Plans (SWPs) encouraged but not required.

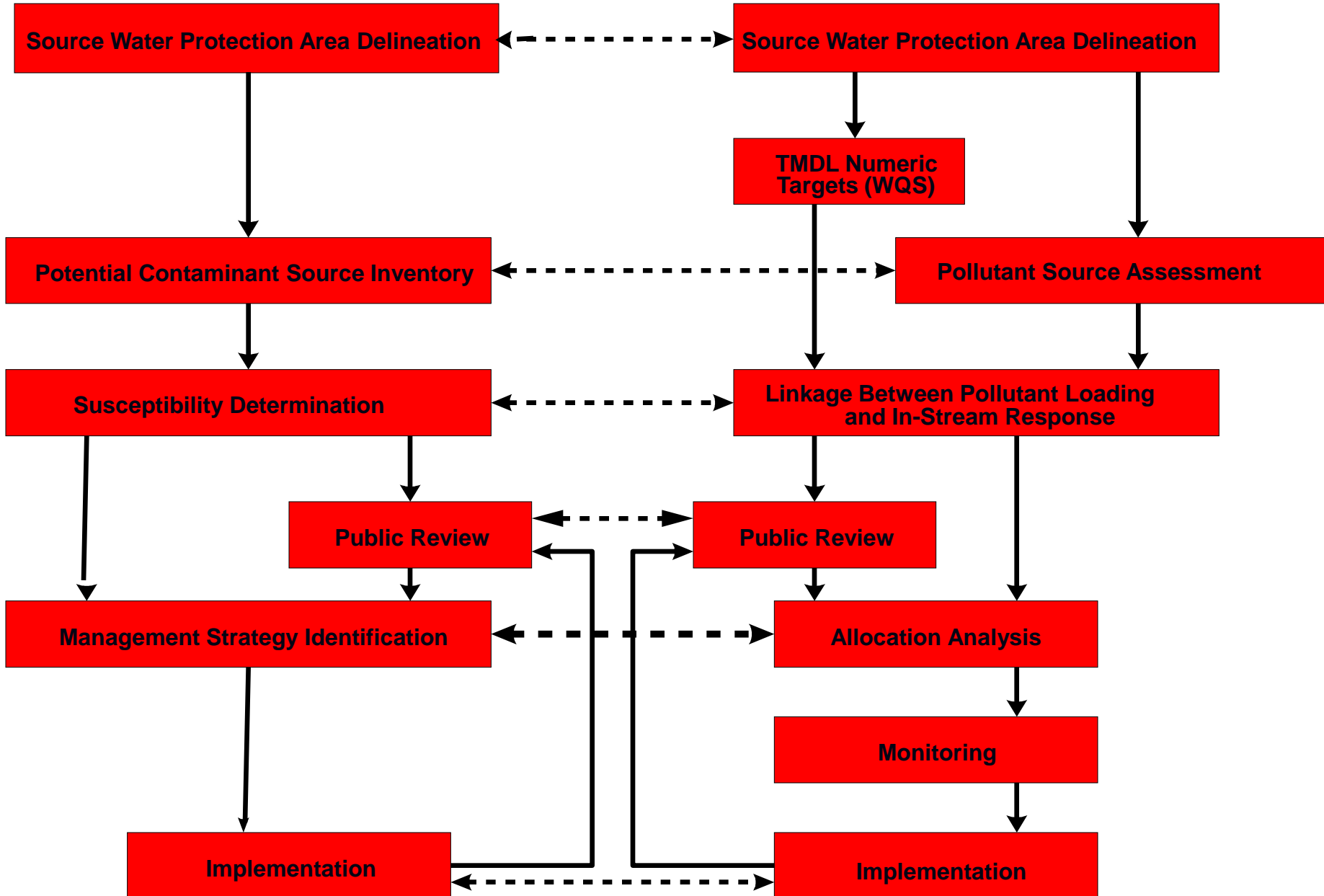
SWAP/SWP Process...simplified



TMDL Process



SWAP/SWP vs. TMDL



TMDLs vs. SWAPs

Major Differences

TMDL

Surface water

Impairment

Specific Pollutants

Quantitative

Quantitative endpoint

Quantitative estimate of loadings

SWAP

SW & Ground Water

Prevention

All contaminants

Qualitative

Not quantitative endpoint

Qualitative characterization of sources

Designated Uses and Effectiveness

- Cadmus:
 - Project 4007: States Survey
 - EPA OGWDW & OST: Water Quality Standards – Community Water Systems (WQS-CWS) Baseline Project

Major categories of pollutants for which TMDLs have been established Oct 95 – Jun 08 (EPA, 2008)

Pollutant	Number of TMDLs	Percentage of All TMDLs
Mercury	6043	17.9
Pathogens	6012	17.8
Metals (other than Mercury)	5563	16.5
Nutrients	3507	10.4
Sediment	2657	7.9
Organic Enrichment/Low Dissolved Oxygen	1638	4.8
Salinity/Total Dissolved Solids/Chlorides/Sulfates	1402	4.2
Oil and Grease	12	< 0.1
Taste, Color and Odor	5	< 0.1
Nuisance Exotic Species	2	< 0.1
Fish Consumption Advisory	1	< 0.1

WQS-CWS Baseline Project (EPA, Draft pending)

- Preliminary Analysis indicates:
 - All States have designated uses for drinking water (phrased in different ways)
 - One jurisdiction had WQS that protect all waters as drinking water sources
 - Some jurisdictions define multiple designated uses for drinking water sources.
 - One distinguish between public vs. private sources
 - Others protect for different levels of drinking water treatment

WQS-CWS Baseline Project (EPA, Draft pending)

- About 20-25% of intakes are located in water bodies NOT designated as sources of drinking water.

How Drinking Water can Get Involved (Cadmus, 2009)

- Review Ambient WQS
- Engage in triennial review process
- Review and comment on 303(d) List of Impaired Waters
- Participate in the TMDL development and review process

Survey responses regarding SDWA and TMDL program integration (Cadmus, 2009)

- SDWA and TMDL Programs within the Same Agency:
 - 56% Well integrated
 - 44% Not Well Integrated
- SDWA and TMDL Programs within Different Agencies:
 - 23 % Well integrated
 - 77% Not Well Integrated

SDWA and TMDLs

Working Between Programs

- 75% of states reported working between programs to develop WQS under 303c.
- “to what extent drinking water regulations are considered when the state develops it’s WQS”
 - 90% reported that consideration is always or sometimes given.

Reference: Cadmus, 2009

**Let's look more specifically at the
Potomac Basin States**