Integrating Drinking Water into Watershed Protection

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Webcast sponsored by EPA's Watershed Academy

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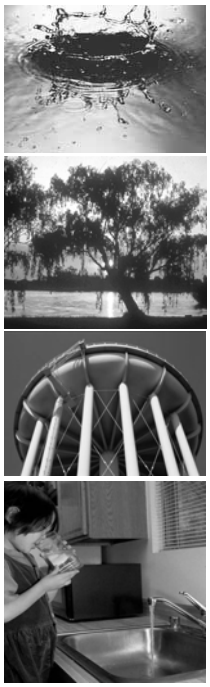

Introduction to Safe Drinking Water Act and Protecting Drinking Water Sources

Office of Ground Water & Drinking Water

U.S. Environmental Protection Agency, Washington, DC

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Drinking Water Protection 101

- Roles and Responsibilities under Safe Drinking Water Act (SDWA)
- Public Water Systems
- SDWA Programs for Protection of Drinking Water Sources

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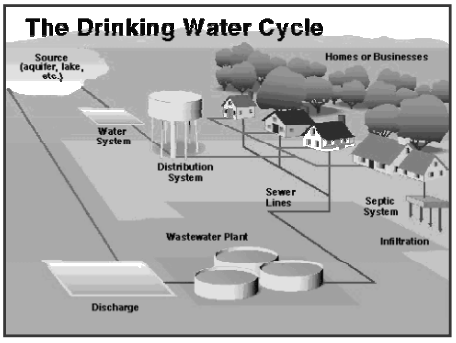
EPA's Water Quality Laws

- **Safe Drinking Water Act (SDWA)**
  - Standard Setting for Drinking Water
  - Public Water Supply Supervision
  - Drinking Water Source Protection
    - Sole Source Aquifer Program
    - Wellhead Protection Program
    - Source Water Assessment Program
  - Underground Injection Control



- **Clean Water Act (CWA)**
  - Water Quality Standards
  - Discharge Permits
  - Waste Water Treatment
  - Wetlands/ Non Point Source

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SDWA's Multiple Barrier Approach to Public Health Protection

Prevention

Standards & Treatment

Distribution System

User -- Information

Goal: Protect Current & Future Sources of Drinking Water

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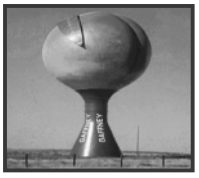
Roles & Responsibilities Under SDWA

- EPA sets health-based drinking water standards
- States implement and enforce standards
- Public water systems are the regulated entity
- Costs of compliance are passed through to consumers



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EPA Sets Health-based Drinking Water Standards

EPA National Primary Drinking Water Standards

	Contaminant	MCL or TT1 (mg/L)2	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Acrylamide	TT9	Nervous system or blood problems	Added to water during sewage/wastewater treatment	zero
OC	Alachlor	0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops	zero
R	Alpha particles	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation	zero
IOC	Antimony	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	0.006
IOC	Arsenic	0.010 as of 1/23/06	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards; runoff from glass & electronics production wastes	0
IOC	Asbestos (fibers >10 micrometers)	7 million fibers per Liter (MFL)	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits	7 MFL
OC	Atrazine	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops	0.003
IOC	Barium	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	2
OC	Benzene	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills	zero
OC	Benzo(a)pyrene (PAHs)	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines	zero
IOC	Beryllium	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries	0.004
R	Beta particles and photon emitters	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta particles	zero
DBP	Bromate	0.010	Increased risk of cancer	By-product of drinking water disinfection	zero
IOC	Cadmium	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	0.005
OC	Carbofuran	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa	0.04
OC	Carbon tetrachloride	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities	zero
D	Chloramines (as Cl_2)	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort; anemia	Water additive used to control microbes	MRDLG=4[1]

LEGEND

D	Disinfectant	IOC	Inorganic Chemical
DBP	Disinfection By-product	OC	Organic Chemical
		R	Radionuclide

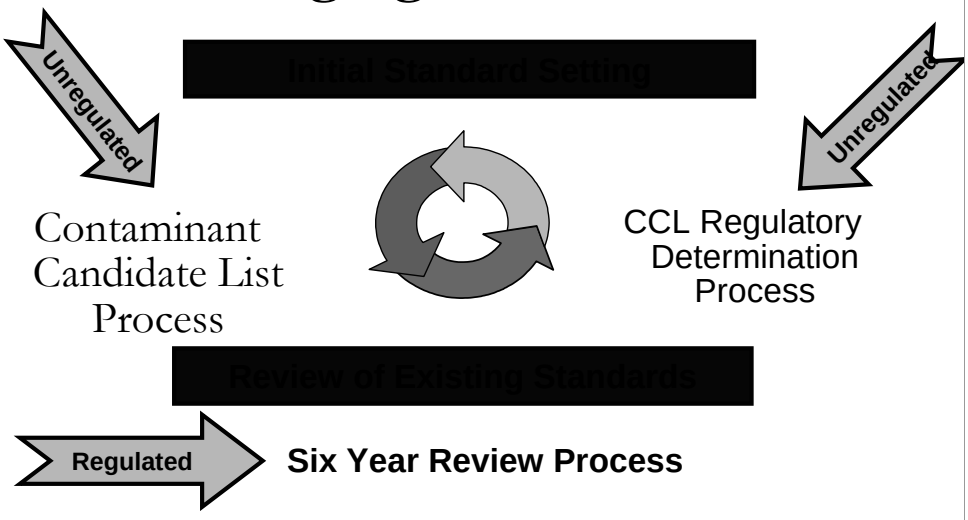
1

Maximum Contaminant Levels or Treatment Techniques for more than 90 of the following:

- **Chemicals**
- **Radionuclides**
- **Microbiologicals**
- **Disinfectants and disinfection by-products**

www.epa.gov/safewater/standards.html

No Formal Definition of "Emerging Contaminants"



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States Implement and Enforce Standards

Public Water Supply Supervision (PWSS) Programs

- **States with primacy (legal authority and capacity) implement drinking water program**
- **For each new regulation, States must receive primacy authority - must adopt standards "at least as stringent" as federal standards**
- **49 States have primacy (WY, DC do not)**

EPA support for State drinking water programs

- **The Public Water Supply Supervision Grant Program**
- **($100M/yr for 1997 - 2003)**
- **Training/technical assistance and data systems**
- **Safe Drinking Water State Revolving Fund**
- **Enforcement Support**

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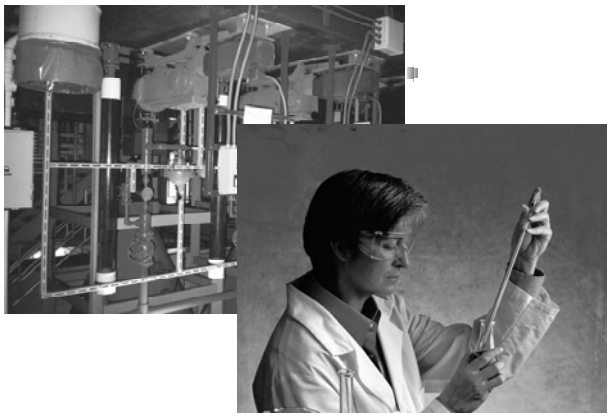
Public Water Systems are the Regulated Entities

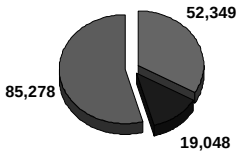


SDWA Protects Consumers Using Public Water Systems

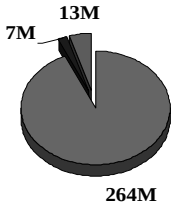
Types of Water Systems

- **Private Household Wells – not regulated**
- **Public Water Systems (PWS's)**
  - **Serve 15 connections or 25 people per day at least 60 days per year**
- **PWS's Include:**
  - **Community Water Systems**
    - **Serving year-round residents**
  - **Non-Community Water Systems**
    - **Non Transient -- serves 25 of same persons for 6 months/year (e.g., some schools, hospitals)**
    - **Transient -- serves 25 persons/day for 60 days/year (e.g., highway rest stops, restaurants)**

157,000 Public Water Systems



Population Served



Source: SDWIS Feds 2006

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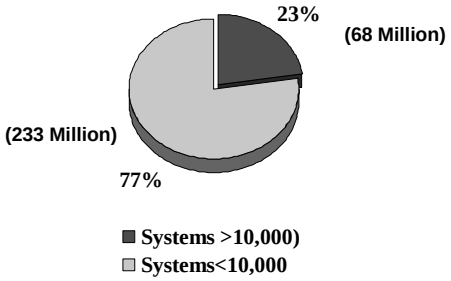
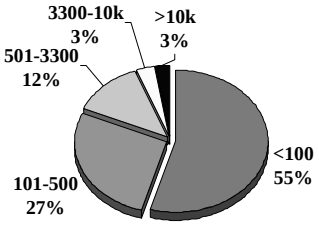
Most People Receive Drinking Water from Large Community Water Systems

Demographics of Community Water Systems

Population served by system size



Size Distribution of Community Water Systems



…yet most community water systems are small (84 %)

Source: SDWIS Fed: 2006

> 3,300 people served

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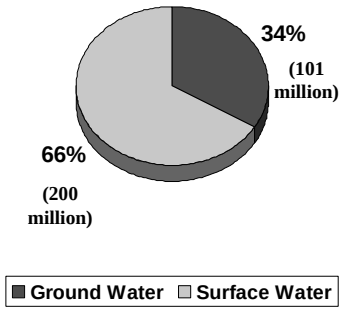
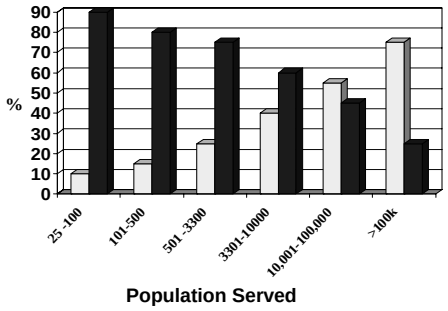
Most of the US Population Receives Drinking Water from Surface Waters

Population Served by Drinking Water Source



Distribution of Community Water Systems by Source Water



…but most small systems use ground water

Source: SDWIS Fed 2006

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Drinking Water Supply Terms

- Public water supply – More than 15 connections or 25 people
  - Community water supply – year round residential populations
  - Non community water system
    - Non transient: since 1986 – regulated like CWS
    - Transient: minimum regulation (microbes and nitrate)
- Can be privately or publicly owned
    - Gotham City and Joe's Trailer Park: public water systems
    - USA Water Inc: privately owned, for profit, community water system
    - Hometown, Ohio: municipally owned, community water system
    - Maple City Park: municipally owned, non-community water system
    - Lake Country Fishing Camp: privately owned, non-community water system
    - Lobster Harbor Regional Water District : Public special authority serving four communities
- PWS own and manage treatment and distribution systems
  - Source water areas may be controlled by ordinance or ownership
    - Wellhead area: area around a drinking water well (groundwater)
    - Watershed source area : watershed above a drinking water intake
- State Drinking Water Programs / Clean Water Programs: may not be in same agency

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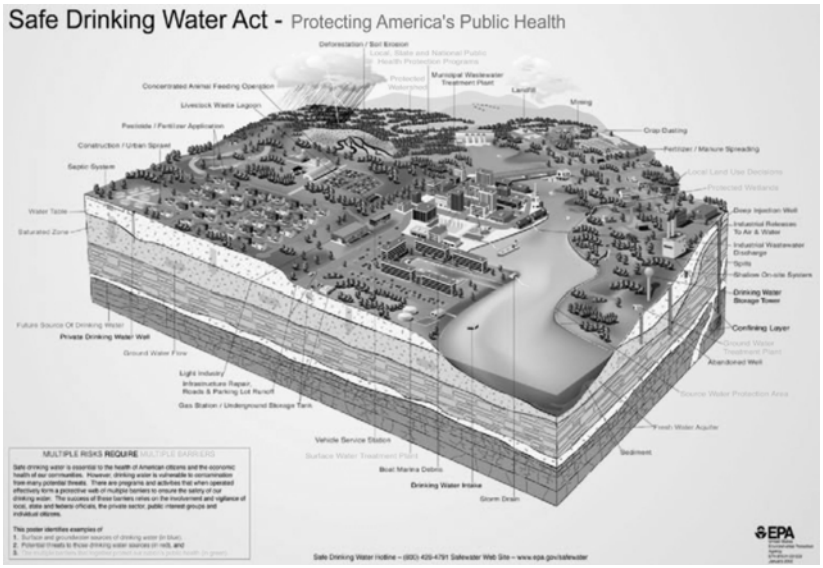
National Drinking Water Source Protection Programs



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EPA Drinking Water Protection Programs under SDWA

- **Sole Source Aquifer Program (1974)**
  - Aquifers providing at least 50% of drinking water, with no other source
  - Any person or party can petition designation
  - Designation requires EPA review of Federally funded projects
  - 75 designated aquifers
    - Most designated in 1980's; with new designations in WA and NJ
- **Wellhead Protection Program (WHPP) (1986)**
  - Section 1428, requires assessment and protection for CWSs
  - All States have EPA approved WHPP programs
  - Some States have mandatory WHP for community water systems (MN, IN)
  - Some States have voluntary WHP (MI, IA)
  - Most incorporated WHP into Source Water Assessment Program (SWAP) after 1996

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EPA Source Water Programs under SDWA

- **Underground Injection Control (1974)**
  - ***Regulates*** construction and operation of disposal wells (a well is deeper than it is wide)
  - **Five classes of wells**
    - I - IV includes permitted oil and gas and hazardous waste,
    - Class V – shallow and low tech, over 600,000
  - **Class V well fundamentals**
    - 1999 rule bans large capacity cesspools/septic tanks, and disposal wells at motor vehicle facilities in drinking water protection areas
    - Owners of shallow disposal wells permitted by rule
    - Inventory and proper operation in source water areas is critical

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Source Water Assessment & Protection Program

(SDWA Section 1453)

- **Purpose: comprehensive assessment / prioritization of potential threats for every PWS**
  - **52,000 community water systems**
  - **105,000 non community water systems**
- **All States developed programs for EPA approval**
  - **Required extensive public involvement in program design**
  - **Built upon existing wellhead and watershed efforts**
  - **Funded through Drinking Water State Revolving Fund**
  - **Diversity from State to State / system type by system type**
- **Protection activities, based on assessment findings, not required by SDWA -- most effective when implemented locally**

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What is a Source Water Assessment?

Delineation

↓

Contamination source inventory

↓

Susceptibility analysis

↓

Public distribution of findings

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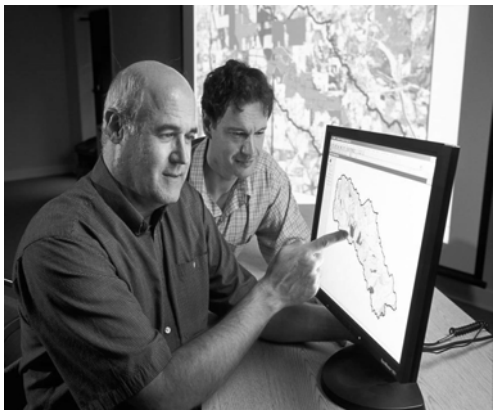
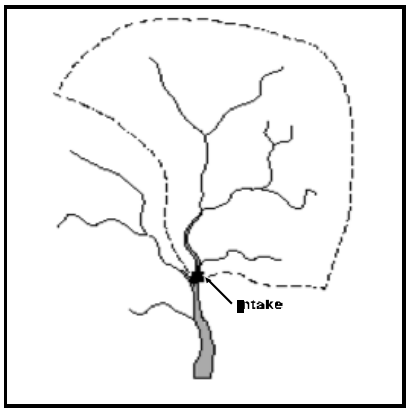
Source Water Assessments

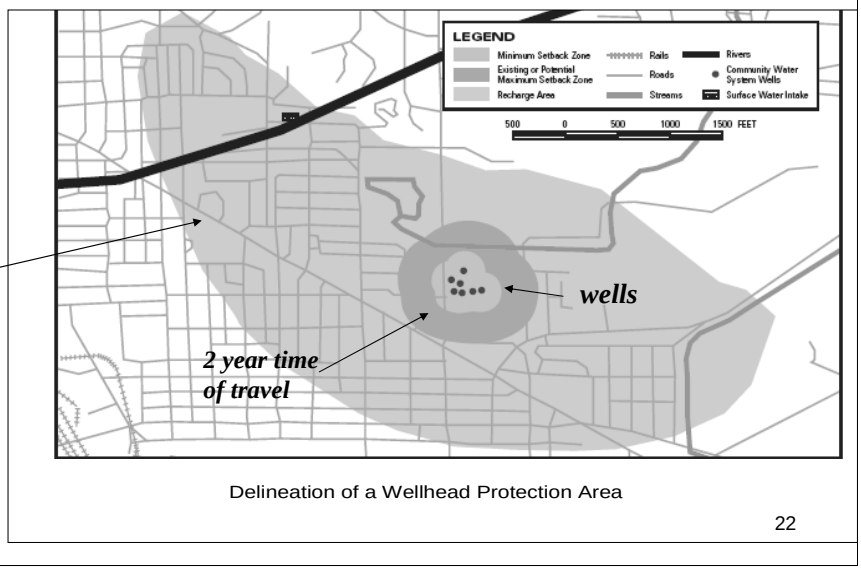
- **Delineation:** the land area that could contribute water and pollutants to the water supply
  - Can be segmented into critical areas for more intensive attention
  - Ground water area based on underground flow
  - Results in a map – many States have GIS
- **Inventory:** Location of significant potential sources of contamination
  - Point sources, land use
  - Available data, some field verification
- **Susceptibility**: Relative risk of the water system to contamination
  - Hydrogeology
  - Type and location of potential sources
  - Intake or well location / integrity
- **Public Availability**: Summaries, internet posting, upon request
  - Minimum requirement is summary and availability information in yearly consumer confidence reports (CCR)

SWPA Delineations for Surface Water-Based Systems





SWPA Delineations for Ground Water-Based Systems



Delineation of a Wellhead Protection Area

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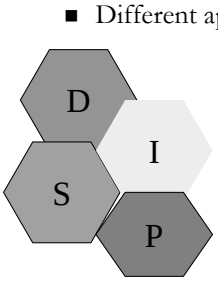
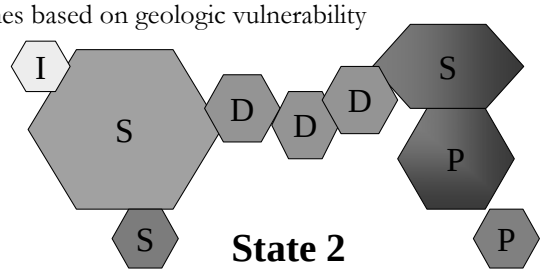
What Do Assessments Look Like

- **Four Basic Required Elements**
  - **D**elineation, **I**nventory, **S**usceptibility, **P**ublic Availability
- **States could mix and match these elements** e.g., with
  - Reliance of existing data vs. developing new data
  - Different approaches based on system size
  - Different approaches based on geologic vulnerability



State 1



State 2

Diversity from System to System / State to State

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Consumer Confidence Reports (CCR)

- **Required yearly reports from community water systems to consumers**
  - Level (or range of levels) of any contaminant found in local drinking water, as well as EPA's health-based standard for comparison
  - Information about any violations of drinking water rule
  - Educational information e.g. cryptosporidium, possible sources of contamination, information resources
- **Source water information**
  - Types of contamination that can be in drinking water
  - Lake, river, aquifer, or other source of drinking water
  - Summary of the susceptibility of the system to contamination
  - Instructions for getting a copy of the system's assessment

CCRs are an opportunity for utilities to highlight drinking water protection accomplishments

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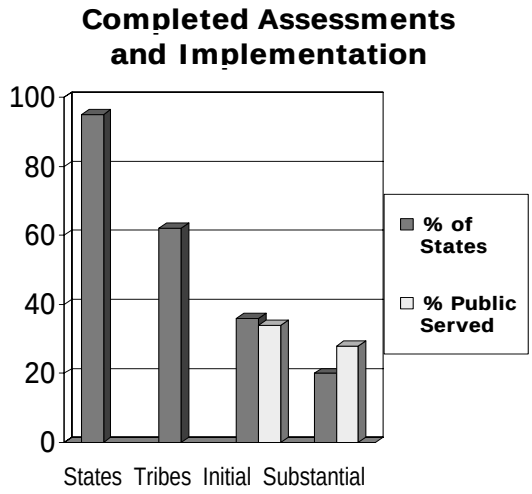
Source Water Protection Today

- Source Water Assessments Completed by States: 95%
- Source Water Assessments Completed by Tribes: 62%
- Initial Implementation of SWP: 36%
- Substantial Implementation of SWP: 20%

Source: State reporting 2005



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Moving from Assessment to Protection

- **Assessments are available:**
  - From State drinking water programs
  - From public water systems
  - Information about availability in yearly consumer confidence report
- **Assessments can jumpstart local protection efforts:**
  - Watershed wide protection
  - Ground water protection
  - Utility / community level projects
  - Targeting priorities (inspections, further assessment, public awareness, clean up, funding)
- **Challenges**
  - Implementation of protection is not required
  - Difficult to gauge progress
  - Growing demand for water / land areas

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National Source Water Priorities

Building Partnerships and Leveraging Resources

- National Source Water Protection Collaborative
- Integration: CWA, UST, CERCLA, etc
- Source Water Grants (NRWA, ASDWA, GWPC, etc)
- State Revolving Funds (DWSRF and CWSRF)

Addressing Priority Contamination

- Identify most threatening sources
- Combine resources where States share priorities

Maintaining Safe and Sustainable Drinking Water Supplies

- EPA Agency-level initiative: Sustainable Water Infrastructure
  - Preserve sources of drinking water
  - Consider water quantity

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Resources

- **Website www.epa.gov/safewater/sourcewater**
  - State specific contacts and websites
  - Searchable case study engine
  - Sign up for EPA source water emails
  - Source water resources from EPA and other organizations e.g.
    - Updating and Enhancing Local Assessments (EPA)
    - Funding for Source Water Activities (EPA)
    - Smart Growth and Water Resources (EPA)
    - Source Protection Handbook (Trust for Public Lands)
    - Source Water Protection for Municipalities (New England Interstate)
- **Training**
  http://www.epa.gov/safewater/dwa/electronic/ematerials.html

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QUESTIONS?

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Integrating Drinking Water into Watershed Protection:

Oregon's Approach

Sheree Stewart
Drinking Water Protection Coordinator
Oregon Department of Environmental Quality
Portland, Oregon

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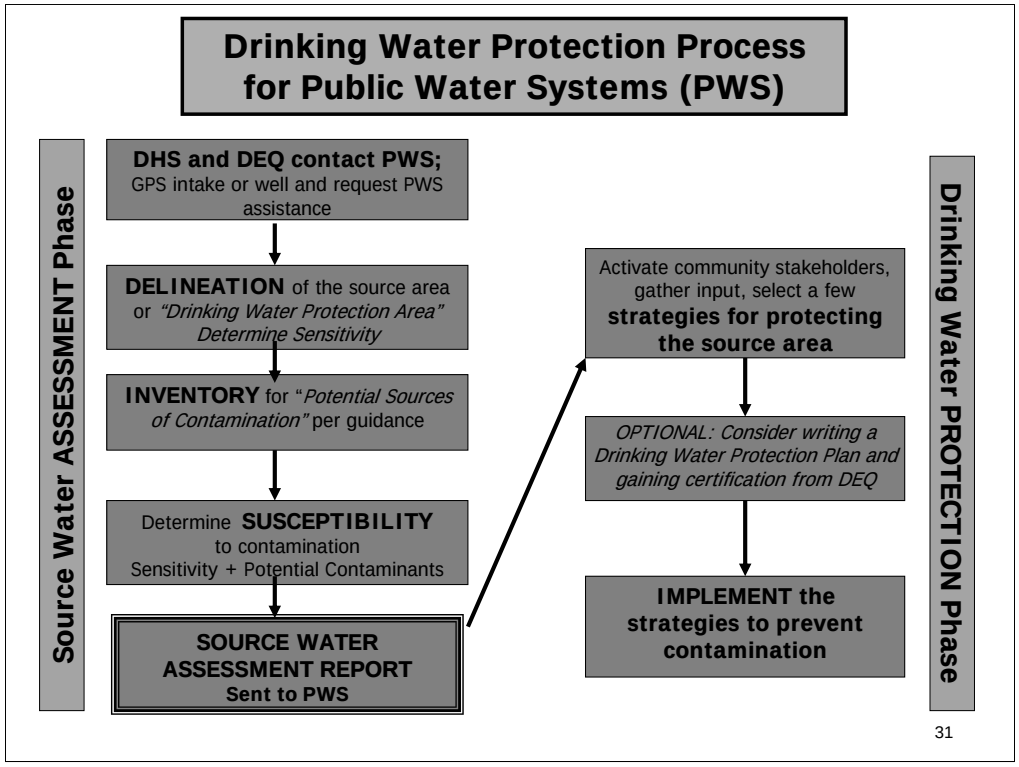
Drinking Water Protection Process for Public Water Systems (PWS)
Source Water ASSESSMENT Phase
DHS and DEQ contact PWS;
GPS intake or well and request PWS assistance
DELINEATION of the source area or "Drinking Water Protection Area" Determine Sensitivity
INVENTORY for "Potential Sources of Contamination" per guidance
Determine SUSCEPTIBILITY to contamination
Sensitivity + Potential Contaminants
SOURCE WATER ASSESSMENT REPORT
Sent to PWS
Activate community stakeholders, gather input, select a few strategies for protecting the source area
OPTIONAL: Consider writing a Drinking Water Protection Plan and gaining certification from DEQ
IMPLEMENT the strategies to prevent contamination
Drinking Water PROTECTION Phase
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Oregon's Public Water Systems Receiving Source Water Assessments

- Surface water - **142** systems
- Ground water - **948** systems (community & nontransient noncommunity, i.e., schools and workplaces)
- Total full assessments – **1090** systems
- Transient noncommunity systems (motels, campgrounds, etc.) - **1040**

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Addn 1452 TNCs

Access database –powerful tool, data is readily accessible

Procedure for Mapping Surface Water Source Area

- Used Geographic Information System tools
- Based on topography
- Delineation of the boundaries of the watershed above intake, based on 5th-field Oregon Sub-Basins
- Identification of consistent "sensitive areas" in each watershed

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Example Source Area for Surface Water Intake

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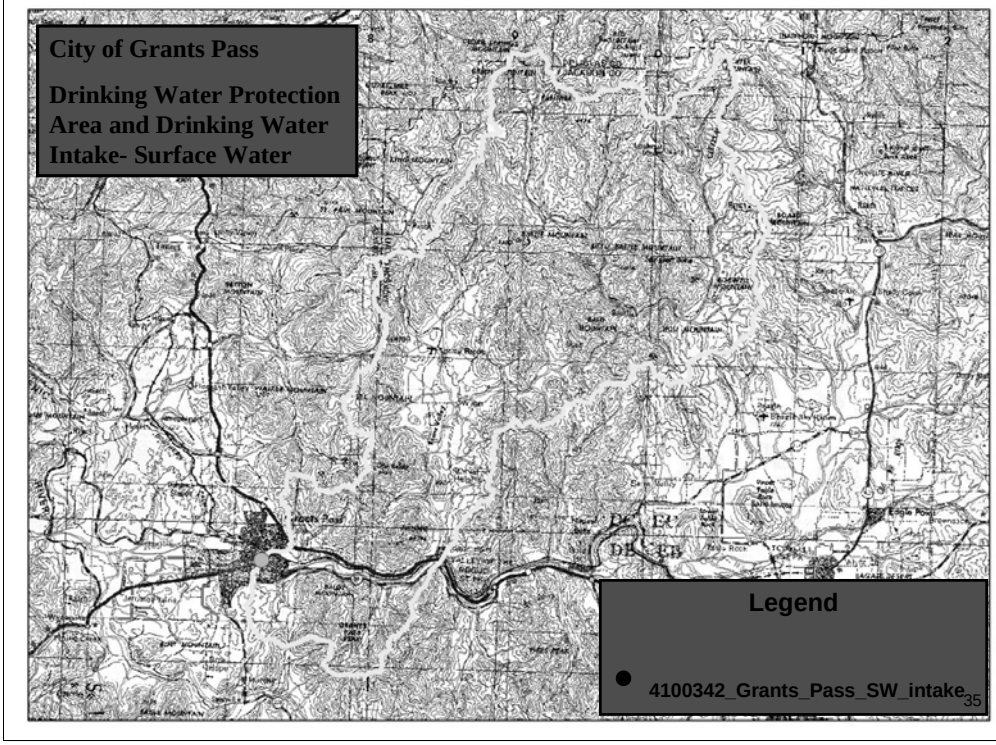
City of Grants Pass
Drinking Water Protection Area and Drinking Water Intake- Surface Water
Legend
4100342_Grants_Pass_SW_intake
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Sensitive Areas Within Watersheds Used for Drinking Water

- **What are sensitive areas ?**
  - **Mapped areas where the potential of a contaminant reaching the source is higher, due to natural conditions or proximity**
- **Sensitive areas for watersheds include:**
  - **Setbacks: 1000' from centerline of water body, includes all perennial streams**
  - **High soil erosion potential (NRCS)**
  - **High permeability soils (alluvials mapped by USGS)**
  - **High runoff potential (Class D soils)**
  - **Landslide hazard areas**

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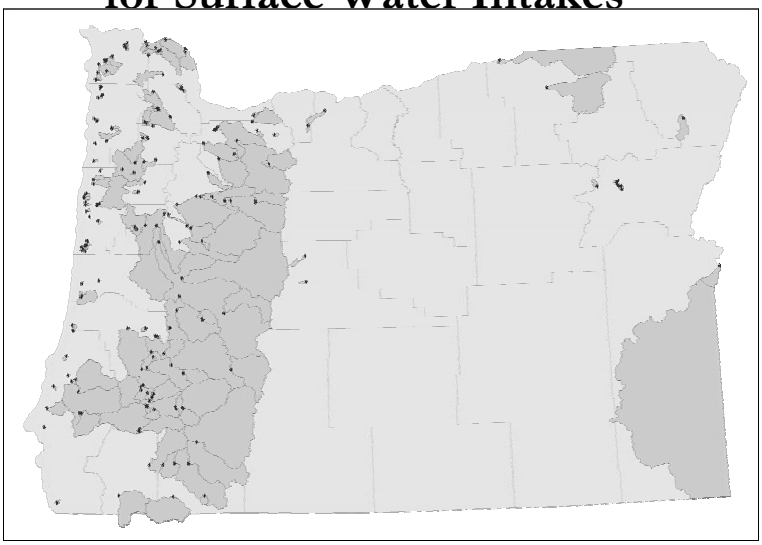
Oregon Drinking Water Source Areas for Surface Water Intakes



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What We've Learned from Surface Water Assessments

- Many of the surface water watersheds include multiple public water systems
- Surface water watersheds contain many different stakeholders, land uses
- Headwaters of most municipal watersheds are in forested land; lower portions primarily agriculture and some urban

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What We've Learned from Surface Water Assessments

- Approximate percentages of land uses within the surface water watersheds
  - **US Forest Service** **37%**
  - **BLM** **11%**
  - **Commercial timber** **22%**
  - **Private, agric, municipal** **25%**

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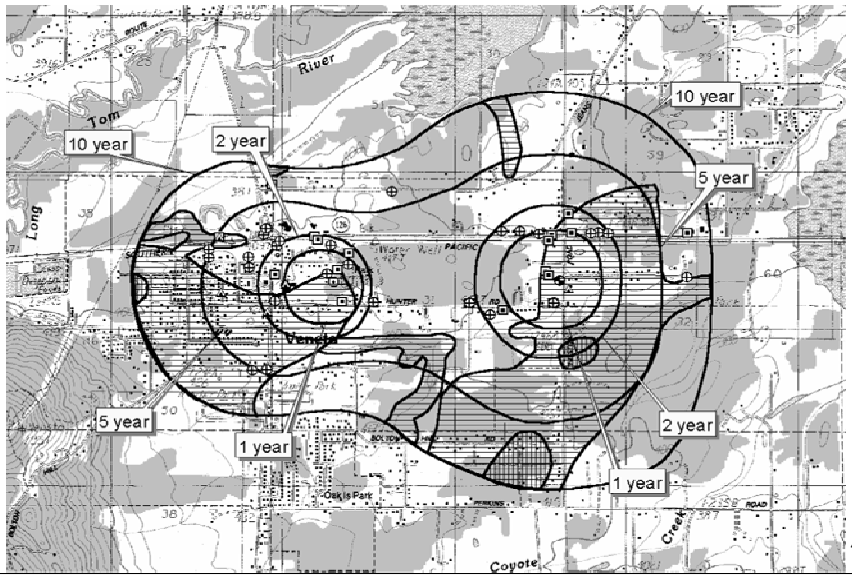
Example Source Area for Ground Water Wells



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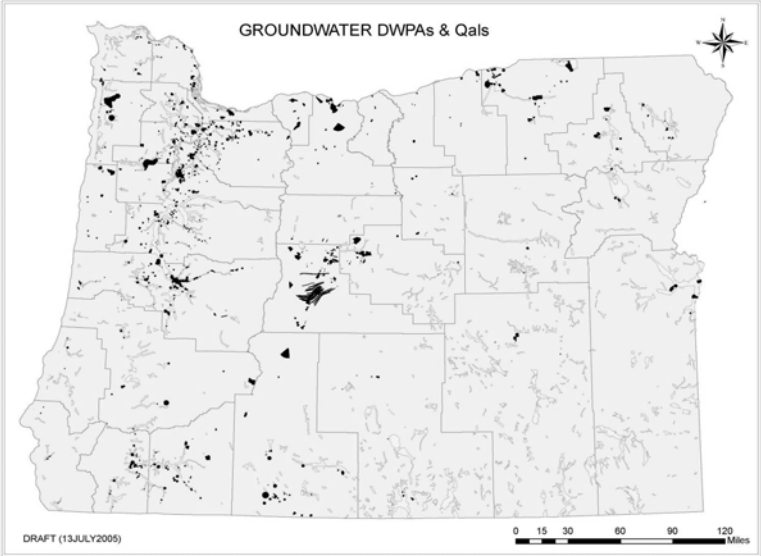
Oregon Drinking Water Source Areas for Ground Water Wells



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Oregon's SWA Inventory Results Groundwater Systems

Top 5 Highest Potential Risks in 2-yr travel time

- High Density Housing (>1 / .5 acre)
  - Sewer lines within 2-year TOT
  - Storm water, HHW, fertilizers, pesticides
- Highways – Heavy Use
  - Petroleum, chemicals, herbicides
- Large Capacity Septic Systems
  - Microbials, nitrate
- Sewer Lines –Close Proximity
  - Fertilizers / nitrates, pesticides
- Above Ground Tanks
  - Petroleum, chemicals

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Oregon's SWA Inventory Results
Surface Water Systems

Top 5 Highest Potential Risks in Sensitive Areas

- Harvested Forests
  - Sediments, pesticides, fertilizers
- Crops – Irrigated
  - Fertilizers, pesticides, sediments
- Grazing Animals (>5 large /acre)
  - Nitrates, bacteria, sediments
- Above Ground Tanks
  - Petroleum, chemicals
- Highways – Stream Crossings
  - Chemicals, petroleum

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Converging Issues

- Pharmaceuticals in Oregon waters
  - USGS data
  - Treatment effectiveness?
- Pesticides in Oregon waters
  - USGS data – agricultural contributions
  - Focused collection events, education
  - New monitoring plan underway
- Other WQ programs
  - TMDL, Oregon Plan, new standards

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Not engaging all the players by regulations!!!!
Classic example
Reporting threshold for TCE 7 gallons
I gallon = 292 Million gallons of drinking water at limit

HHW big issue!!!!

Oregon Drinking Water Protection Opportunities

- Assessment Reports provide a tremendous amount of information to each community
- Can be used to set local priorities for Oregon's land use planning
  - Example county packet
- GIS and database resources are already being used by other agencies/organizations
  - Other DEQ programs, Counties, Cities, USFS, BLM, ODOT, OERS, DLCD, ODF, ODA, others

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Important Elements of Protecting Drinking Water Source Areas

- Consider all components of water cycle: emphasize need to include groundwater
- Include reduction of risk of loss
- Water quality improvements = immediate fixes + long-term protection
- Balance responsibilities in protection area
    - Many small changes vs. few major changes

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Student answers to question…

What would you do to prevent WQ contamination on your land if you drank the water that ran off your property????

Is this the key to motivate action?

Examples of Voluntary Risk Reduction Activities

- Residential
  - Household hazardous waste collection
  - Improved septic system maintenance
- Commercial / Industrial
  - Pollution prevention technical assistance
  - Mentoring & partnerships
- Agricultural
  - Improved irrigation practices
  - Improved nutrient/pesticide practices
- Forestry
  - Improved pesticide practices
  - Reduce sediment loading
    - Reduce road densities / increase stream buffers

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Typical Coastal System
Drinking Water Intake

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Example Components of a Recent DW Protection Plan

- **Debris cleanup and regular inspection**
- **Installation of gate to restrict access**
- **Potential designation of certification under *Forest Stewardship Council***
- **Engage private owners**
- **Install signs for hikers, bikers**
- **Delay sensitive area harvest and seek grants to avoid ground disturbance**

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Oregon Drinking Water Protection Challenges

- Most communities/water systems don't have jurisdiction over their source area
- Community water systems' reluctance:
  - to discuss risks with consumers
  - to take the time to do the protection planning
- Common misconceptions
  - required water testing /MCL limits are enough
  - area immediately adjacent to well or intake is all that matters

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Oregon Drinking Water Protection Challenges

- Lack of data to motivate change
  - no data, no reason for concern (?)
- Inconsistent state agency priorities
  - rules and assistance not focused on WQ/DW
    - Oregon Dept. of Agriculture
    - Oregon Dept. of Forestry
- Lack of data to assess true risks
  - no synergistic effects information
  - data gaps
    - 62 pesticides identified in recent study
    - Current drinking water supply for 127,500 people
    - 15 of these pesticides are monitored for every 3 years
    - Exposure issues ???

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High Priorities

Determined by Assessment Results

- ***33*** **Discharges for municipal wastewater treatment plants upstream of intakes**
  -pharmaceuticals and personal care products
- ***6*** **Reservoirs with human contact recreation**
  -fuels and microbial risks
- ***171*** **Leaking underground storage tanks in sensitive areas**
  -99 of these within 2-year time-of-travel for GW wells
- ***211 (32%)*** **Community systems are highly sensitive and have coliform sources within 2-year time-of-travel**

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New Directions -
Using Assessment Results in Oregon

- DEQ Toxics Monitoring plan addition
  - **GOAL: to determine priorities *based on data***
  - **Link to public health goals in all agencies**
  - **Significant data gaps**
    - ambient monitoring
    - DW regulations
    - CWA/SDWA 37 parameters in common
  - **Determining priorities**
    - susceptibility data
    - density of potential contamination sources
  - **Identify variety of sources to sample**
  - **Upstream of SW intakes and raw water at wells**

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New Directions -
Using Assessment Results in Oregon

- USGS and PWS data as a basis for technical assistance and activities
  - **DEQ Laboratory partnerships**
    - example: Clackamas River
  - **USGS NAWQA reports**
    - 2006 report: DDT, Atrazine, 2,4-D in Willamette
  - **PWS data collection (large systems only)**
    - example: Eugene / McKenzie River

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Example of PWS Work:
Eugene – McKenzie River

- **EWEB research and monitoring- EXCELLENT!!!!**
- **High risk priorities**
  - stormwater/runoff
  - agricultural uses
  - forest management
  - hazmat transport (27 trucks /day)
- **Storm event monitoring**
  - bacteria hotspot sources
- **Pesticide monitoring in McKenzie and tributaries**
  - forestry – 90% of watershed by area
    - 75,000 pounds per year of pesticides
  - agriculture – small %, but near intake
    - 6,000 pounds per year of pesticides

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Example of Multi-Agency Work:
Clackamas River
Pesticide Reduction Pilot

- **Linked pesticide application data with priority stream reaches**
- **DEQ lab developed collaborative partnerships with local communities, SWCD, Dept Ag, etc.**
- **Conducted extensive sampling**
- **Used data to support and encourage voluntary BMP changes**
- **Legacy pesticide collection events:**
  SIGNIFICANT success removing high-risk pesticides

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New Directions -

Using Assessment Results in Oregon

- Reviewing permit conditions/actions
  - **NPDES and WPCF permit coordinators discussing how to bring drinking water issues into the individual permit processes**
  - **33 domestic NPDES discharges upstream – population potentially affected: 304,598**
  - **25 WPCF/NPDES/General from industry**
  - **PWS intakes not usually indicated through applications and limits in permits**

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New Directions -
Using Assessment Results in Oregon

- **SDWA grant opportunities**
- **$20,000 per PWS, per year, maximum**
- **Selection based on risks, reduction, etc.**
- **Examples of eligible projects**
    - Water recycling / conservation
    - Pollution prevention outreach or workshops
    - BMP education / implementation
    - Installation of signs / fences
    - purchase of land easements or buffers
    - Secondary containment for high-risk above-ground tanks
    - Closure of abandoned wells
    - Development of an Ordinance

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Oregon Drinking Water Protection
Next Steps

- **Encourage regional strategy development**
  - **large system with embedded small systems**
- **Develop strategy to address 5-10 highest risks for groundwater and surface water**
  - **ex: spill response grants, homeowner outreach**
- **Continue to integrate with Clean Water Act work, BLM/FS planning, DHS Sanitary Surveys, and DEQ watershed approach**
- **Adapt and evolve**

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A Healthy Watershed Means Healthy Drinking Water

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QUESTIONS ???

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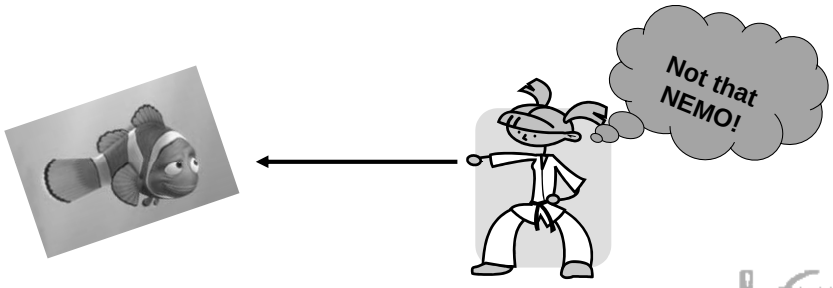
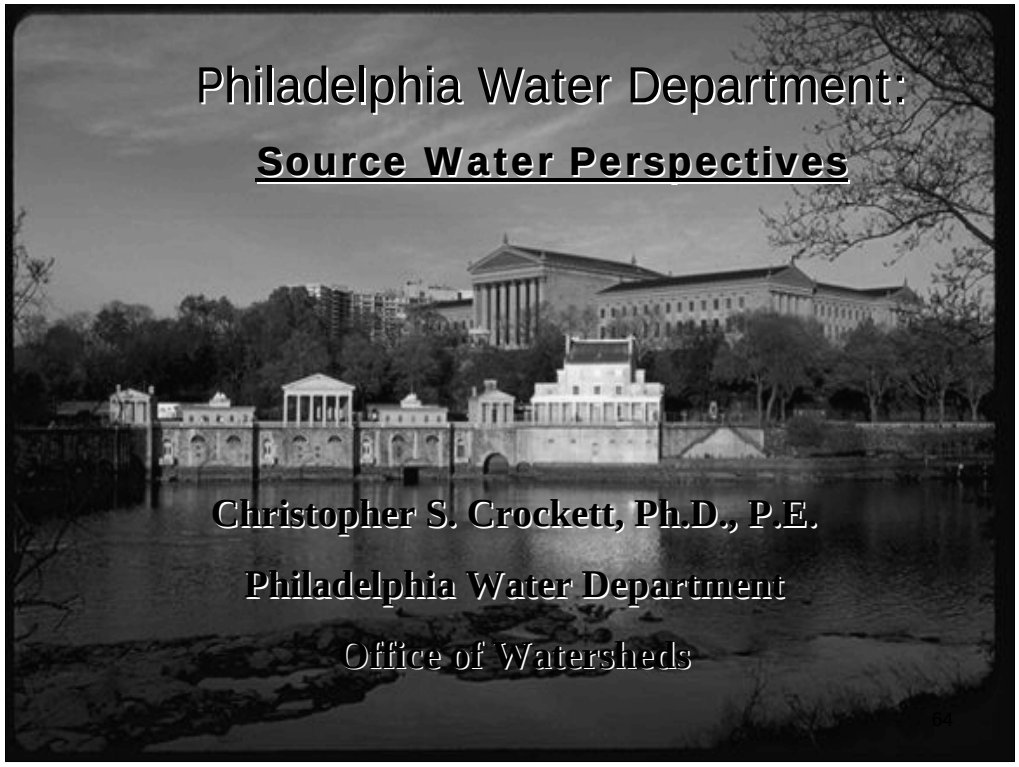
Be Sure to Check Out our January 17th Webcast On:



Nonpoint Education for Municipal Officials

63


Philadelphia Water Department:
Source Water Perspectives
Christopher S. Crockett, Ph.D., P.E.
Philadelphia Water Department
Office of Watersheds
64

PWD's Source Water Program

- **Established 1999**
- **Charged with looking outward to identify threats and protections priorities for PWDs water supplies**
- **Drivers**
  - Source Water Assessments & CCR requirements
  - LT2 Enhanced Surface Water Treatment Rule
  - Continuous public relations challenges
  - Integration with stormwater and CSO watershed initiatives
- **Industry trend toward Source Water Protection**
  - degrading source water quality
  - higher finished water quality standards
  - emerging contaminants
  - regulatory initiatives
  - multi-barrier approach

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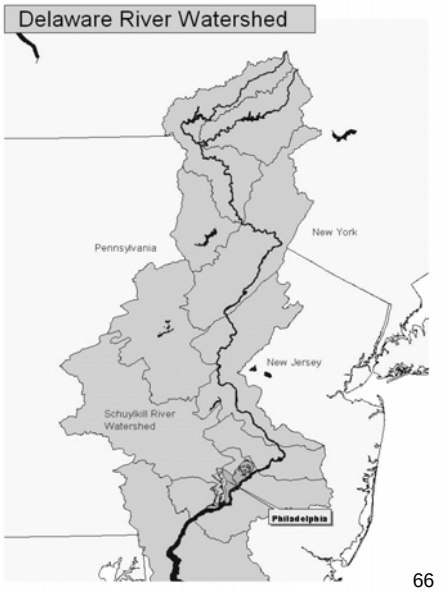
PWD's Source Water Program

- **PWDs three WTPs are at the bottom of two very large, diverse and highly developed watersheds**
- **Source Water Protection is a daunting task in such large watersheds where we don't have ownership of the water resources**
- **Key to a successful Source Water Protection Program is a watershed approach fueled by partnerships and collaboration**
- **A regional Source Water Protection Plan (SWPP) for the Schuylkill River is one component of such a program**



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Philadelphia's Incentives For Source Water Protection

- **Financial – avoid ozone/UV – big $$$**
- **Public Relations – reporters always asking questions and need to be prepared**
- **Operational – algal impacts on filters and taste and odor**
- **Safety/Sustainability – major spills/accidents and terrorism concerns**
- **Multiple**

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What's Your Incentive For SWP?

- **Financial**
- **Public Relations**
- **Operational**
- **Safety/Sustainability**
- **Multiple**

* **A sustainable and strong SWP Program should have clear examples of all of these incentives.**

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Steps to Building PWD's Current SWP Program

- **Step 1 – Start with small building block projects to establish experience & legitimacy and demonstrate value of SWP**
- **Step 2 – Obtain recognition and buy in by peers, community, and regulatory agencies (awards, etc.) to help cement long-term organizational commitments of resources**
- **Step 3 – Create efforts with coalitions and partnerships that have momentum to take on the big things**

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How Did It All Start?

- Small – 1 person
- Needed to do something close to intake
- Wanted to demonstrate local results before going upstream
- Chose a simple project that could be done easily
- Applied for a grant
- Coordinated effort with other organizations and volunteers
- Now its our "marquee" project

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Components of a Successful Start

- **Small project with short timeframe (1-2 years)**
- **Obtained grant funding and leveraged it against other resources**
- **Found common thread to build a partnership around locally**
- **Made sure we could obtain measurable results**
- **Very visible site for public relations benefits**

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Small Building Block Projects

- **Belmont Intake Protection Project**
  - **40 tons of goose feces kept away from intake**
  - **200 geese now gone from intake!**
- **Fox Chase Farms Streambank Fencing Project**
  - **Bacteria levels in stream reduced by 90%**

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Then Found a Vehicle to Do Something Larger

- **Source Water Assessments**
- **Early Warning System**

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Source Water Assessments

- **Obtained $625,000 in grant funding as contractor to PADEP to assess 52 intakes in the Schuylkill and Delaware River Watershed**
- **Paid for groundwork and major elements of our source water protection program**
- **Gave us a venue to reach key partners and public**
- **Helped develop partnerships and coalitions**
- **Established our legitimacy as regional player**
- **Developed a mechanism to lead to implementation and policy efforts**
- **Helped prepare us for the LT2ESWTR WCP credit**

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Early Warning System

- **Obtained $775,000 in grant funding**
- **Developed an "operational" component of our SWPP that addressed internal needs after 9/11**
- **Opened regional doors through emergency response areas that normally wouldn't be accessible**
- **Showed our leadership and vision in the region and the nation**
- **Used in recent oil tanker, arsenic, and cyanide spills to protect the city's water supply**

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Then Found a Vehicle to Do Something Larger

- **Schuylkill Action Network**
- **Targeted Watersheds Grant**

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Source Water Program Initiatives

- **Conducted Source Water Assessments for 52 intakes in the Schuylkill and Delaware Watersheds – 1999 to 2003**
- **Awarded PADEP Source Water Protection Grant July 2002**
- **Developed a Regional Early Warning System 2002 to 2004 and ongoing**
- **Established the Schuylkill Action Network – Oct 2003**
- **Awarded EPA Targeted Watersheds Grant for the Schuylkill River – July 2004**
- **Develop Source Water Protection Plans for the Schuylkill and Delaware Rivers 2003 to 2006**
- **Implement Source Water Protection Plan 2004 on**
- **Implement Initiative Grant Work Plan 2005 on**
- **Develop LT2SWTR Watershed Control Program - 2009**

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Steps to Building PWD's Current SWP Program

- **Step 1 – Start with small building block projects to establish experience & legitimacy and demonstrate value of SWP**
- **Step 2 – Obtain recognition and buy in by peers, community, and regulatory agencies (awards, etc.) to help cement long term organizational commitments of resources**
- **Step 3 – Create efforts with coalitions and partnerships that have momentum to take on the big things**

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From Assessment to Protection Strategy

In March 2003, EPA began a partnership with the City, State and other stakeholders

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Source Water Protection Strategy

Integrated Workgroups and Support Teams

Storm Water Runoff

Agricultural Runoff

Acid Mine Drainage

Pathogens/Compliance

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Workgroup Charge

- **Identify Key Partners**

- **Roles & Responsibilities**
- **Draft & Implement Plan**
- **Document Activities**
- **Measure Results**
- **Communicate Regularly**

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Goals of Schuylkill Action Network

Source Water Protection

Work cooperatively with interested partners to:

- **support existing protection efforts;**
- **educate others;**
- **enhance communication;**
- **transfer the experience; and**
- **identify and resolve environmental issues with shared regulatory responsibility.**

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The Possibilities: Early Successes

- **Within less than 2 years:**
  - **Initial Source Water Protection Strategy put in place**
  - **Over 50 partner organizations and 240 individual members signed on for support**
  - **Work plans and milestones in 4 priority areas of work**
  - **Securing Funding Support from Federal, State and private funding agencies**

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The Possibilities: Early Successes

- **Consensus Work plans as Magnets for Funding:**
  - **EPA National Targeted Watershed Grant**
  - **USDA Conservation Security Watershed designation**
  - **PA Growing Greener Funding**
  - **Exelon settlement funds – DRBC**
  - **Restoration Fund creation underway**
  - **Funders Forum Created for private foundations**
  - **Storm water Demonstration Study in the Wissahickon basin**

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The Possibilities: Early Successes

- **Establishing necessary links between land managers, storm water and stream health**
- **Taking direct actions to reduce risk:**
  - **Combination of compliance actions, assistance, education, acid mine flow reduction**
- **Compliance evaluations targeted to sources identified in the SW Assessment**
  - **Several actions and settlements completed**

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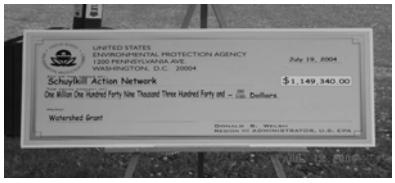
Implementation: 2004 EPA Targeted Watersheds Grant (TWG)

- **SAN was awarded $1,149,340 for the implementation and construction of 36 "demonstration projects"**
- **Grant will be managed by Partnership for the Delaware Estuary**
- **Funds will act as "seed money" to launch the SAN's initiatives and begin long-term restoration fund**



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Results So Far

- **Finishing second year of TWG grant**
  - **4 stormwater projects including LID approaches at 2 schools and 1 park**
  - **Implementing headwater streambank fencing for cattle**
  - **Constructing treatment wetlands and mitigating acid mine drainage**

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Next Steps for SAN?

- **Continue to implement grant and monitor success**
- **Development of Restoration Fund & Leveraging/Prioritization of future regional grant funding (public/private)**

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The Delaware Valley Early Warning System – A Water Supply Security Success Story

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Early Warning System

- **PWD's intakes are downstream of :**
  - **more than 10,000 regulated facilities**
  - **major pipelines**
  - **railroads and highways**
  - **tanker and shipping lanes**
- **There is obvious need to invest in ensuring we are aware of upstream events**

Delaware Valley EWS Event Activity Report

- Events Reported
  - In 2004 – during beta testing
    - 16 events - 9 spills, 3 algae / taste & odor, 4 general water quality
    - Spills - 3 – sewage, 4 - oil/diesel fuel, 1 – herbicides, 1 - molten phenol
  - Since January 2005 – full operation mode
    - 72 events entered into the EWS
      - 52 reports – 12 oil, 7 chemical, 10 sewage, 11 general, 12 other
      - 1 algae bloom/taste & odor

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Big Events

- **2004 - 320,000 gallon oil tanker spill**
- **2005 – 110 million gallon fly ash with arsenic spill**
- **2006 – cyanide spill & fish kill shutting down half the city's water supply**
- **Realized that water quality & public communication have some connections**

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Rivercast System

- Started June 2005
- Website www.schuylkillrivercast.org
- Provides recreational rating of river with respect to anticipated bacteria levels
  - Red, Yellow, Green
- Updated hourly – online spinoff of early warning system using Philadelphia data only

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PHILLY RIVERCAST A Daily Forecast of Schuylkill River Water Quality in Philadelphia

Wednesday, March 9
Current RiverCast:
GREEN
click for details

- **Home**
- Definitions of Water Quality Designations
- How is the RiverCast Created?
- Why Water Quality Changes?
- Water Quality and Health Concerns
- RiverCast Trends
- Links
- Contact us

Number of visitors
0003475

Site brought to you by
Philadelphia Water Department
with funding from the
Environmental Protection Agency

Welcome to Philly RiverCast

What is RiverCast?

The Philly RiverCast is a forecast of water quality that estimates potential levels of pathogens in the Schuylkill River between Flat Rock Dam and Fairmount Dam (i.e., between Manayunk and Boathouse Row).

The Schuylkill River, like all urban rivers, is not a pristine body of water and is subject to contamination from many sources and activities that either discharge directly, or enter the river during rain events. Because rivers are vulnerable to such contamination, recreation in or upon any body of water has with it an inherent risk of illness and infection for the individual involved.

RiverCast Water Quality Designations:

GREEN: Water quality is suitable for all recreational activities. Click for more details.

YELLOW: Water quality may not be suitable for activities involving direct contact with the river. Click for more details.

RED: Water quality not suitable for activities involving direct contact with the river. Click for more details.

Limitations of Philly Rivercast

Inherent uncertainty and potential for error is associated with any forecast of water quality.
Therefore, the RiverCast should be considered a guideline and general estimate of water
quality at a given period of time and not a direct measurement of water quality. Other
information, policies, regulations, public health statements, data, or observations should
be considered in addition to any River-

Recreation in Philadelphia Waters

Philadelphia's rivers and streams are not designated swimming areas, and swimming and bathing are not permitted outside of organized events (e.g., races, triathlons, etc.), due to risks of drowning, injury from submerged objects, strong currents, and other hazards. Individuals should consult a physician before engaging in recreational activities that would place them in contact with river water. Persons with compromised immune systems should consult their health care provider before participating in recreational activities that place them

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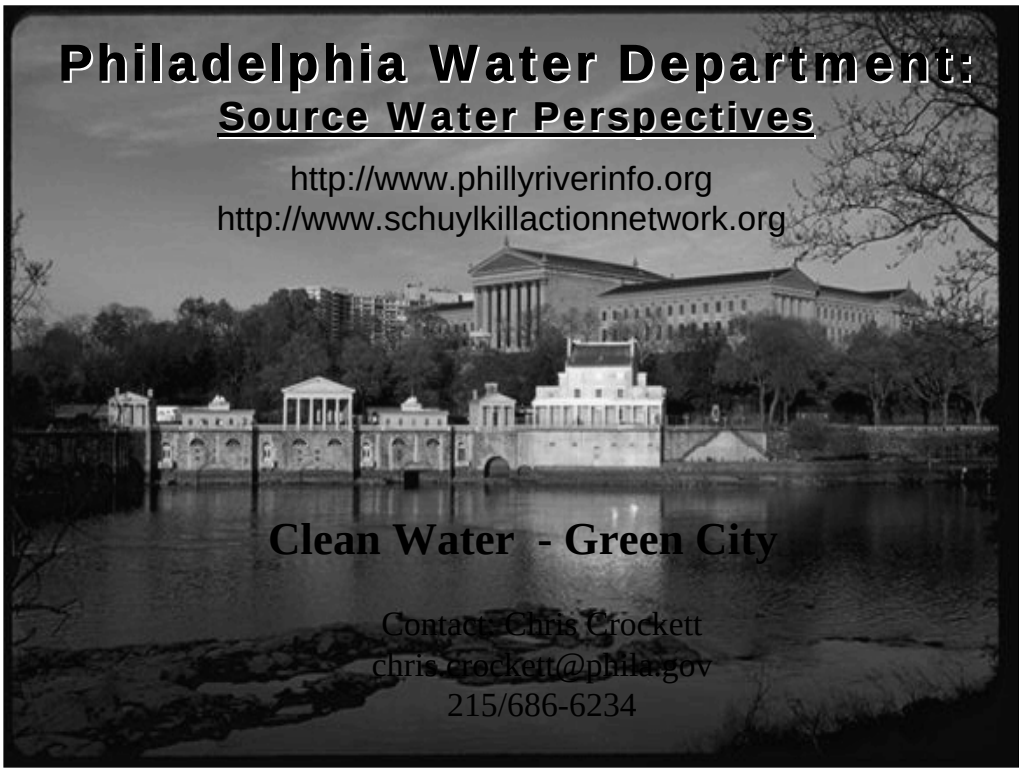
Philadelphia Water Department:
Source Water Perspectives
http://www.phillyriverinfo.org
http://www.schuylkillactionnetwork.org
Clean Water - Green City
Contact: Chris Crockett
chris.crockett@phila.gov
215/686-6234

QUESTIONS?

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Check out some additional resources at:

http://www.clu-ing.org/conf/tio/owintdriwat/resource.cfm

Have comments on this Webcast? Please fill out our evaluation form at:

http://www.clu-ing.org/conf/tio/owintdriwat/feedback.cfm

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