

GROUND WATER RULE (GWR) presented by: Florida Rural Water Association

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The GWR Intorduction

- The Ground Water Rule establishes a risk-targeted approach to target ground water systems that are susceptible to microbial pathogens, specifically bacteria and virus.
- The method for detection of pathogens has changed in the treatment of total coliform positives and includes more specific additional fecal indicators
- The occurrence bacteria, especially the fecal indicators, in a drinking water supply, is an indication of the potential presence of microbial pathogens that may pose a threat to public health.
- Potential threats to PWSs will be identified by Sanitary Surveys, Source Water Monitoring, and Treatment Technique Compliance Monitoring.

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When does the GWR go into affect ?

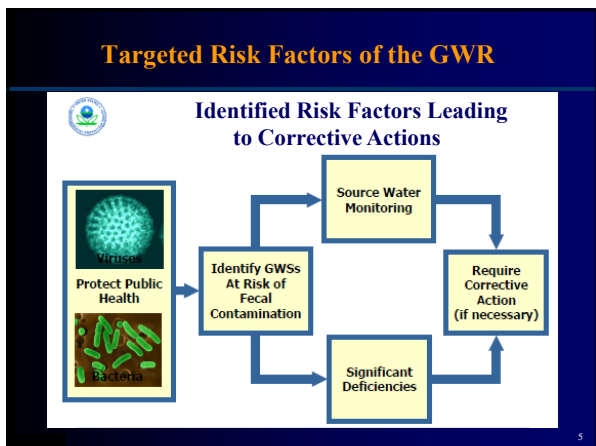
The Ground Water Rule is an EPA rule that Florida is required to implement on **DECEMBER 1, 2009**.

PWS Requirements	Required By:
Notification of 4-log treatment of viruses	December 1, 2009
Required Beginning:	
Triggered source water monitoring	December 1, 2009
Corrective actions	
Compliance monitoring	
New sources placed in service must meet triggered source water monitoring requirements or conduct compliance monitoring for 4-log treatment of water	
States can require GWSs to conduct assessment source water monitoring	
State Requirements	
Complete sanitary surveys for most CWs	December 31, 2012 (& every 3 years after)
Complete sanitary surveys for NCWSs & remaining CWs	December 31, 2014 (& every 5 years after)

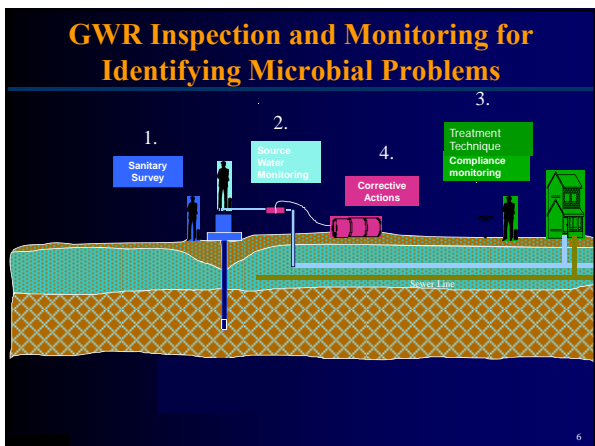
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What PWSs are Covered by GWR ?

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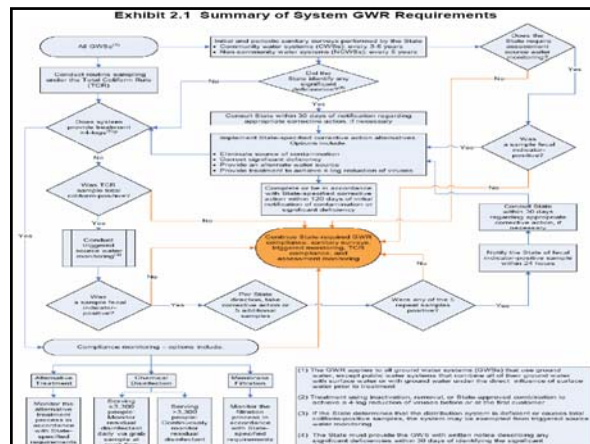


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Requirements of the GWR

- EPA has provided a flow chart that shows how the Ground Water Rule rule is to be implemented.
- The following slide illustrates that monitoring and follow up actions must take place for each microbial threat that might occur in a PWS.
- Since the Flow Chart is difficult to follow, this presentation will break down the boxes into their components and relationships

The Flow Chart Follows:



Basic Requirements of GWR

Sanitary Surveys of all GWS	Source Water Monitoring
Corrective Actions for Significant Deficiencies & Fecal Contamination	Compliance Monitoring

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How the GWR and Total Coliform Rule will Interact

Relationship with the TCR

- Total coliform-positive result from a routine sample taken under TCR triggers GWR source water monitoring

For more information on the TCR see [Total Coliform Rule: A Quick Reference Guide](#)

Available on EPA's Web site at: www.epa.gov/safewater/disinfection/tcr/pdfs/raq_tcr_v10.pdf

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GWR will Shift Focus of TCR

- Monitoring now Results in Investigation and Follow Up Corrective Action
- Reporting will change to to Public Notification under specific criteria
- The Benefits are anticipated to be improved Public Health Protection and less Public Confusion associated with Public Notifications for Total Coliform Violations

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Revised TCR for GWR Compliance

- No RMCL Goal for TC+
- TC exceedance triggers assessment and corrective action of any deficiencies
- A Treatment Technique (TT) violation results when no assessment or corrective action is taken
- The E. coli MCL remains zero
- Enterococci and Coliphage are added as alternative fecal indicators for Source Water Monitoring
- Fecal Coliform is no longer used
- Public Notification for TT violation or acute MCL violation is now required

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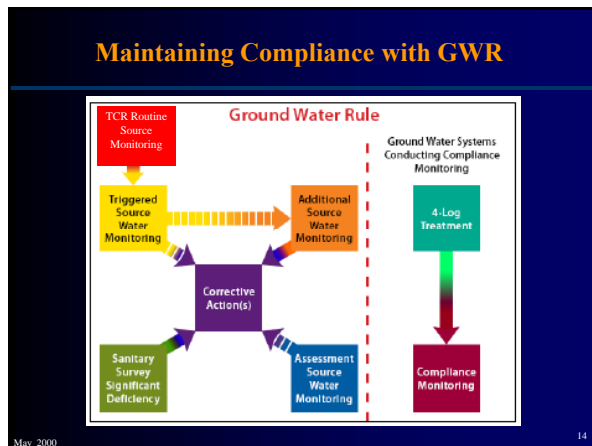
New GWR Fecal Indicators for Source Water Monitoring

Source water samples are to be analyzed using one of the following methods:

- E. coli
 - Colilert test
 - Colisure test
 - MI agar
 - m-ColiBlue24 test
 - E*Colite test
- Enterococci
 - Multiple tube technique
 - Membrane filter technique
 - Enterolert
- Coliphage
 - EPA method 1601
 - EPA method 1602

Note:
PWS should contact Laboratory if new sample analysis is contemplated.

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Routine Monitoring

- One TC Sample from each source well
- Water distribution Sampling Plan
- Collection and analysis for TC based on system size each month
- Repeat sampling for TC and E. coli

**Routine
WD and
Source Water
Monitoring**

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Requirements for Reduced Monitoring for CWS under GWR

- Satisfactory Sanitary Survey Results
- No History of Compliance Exceedances and One (1) of the Following:
 - Active Cross Connection Control Program
 - Meeting Disinfection Criteria
 - Other Enhancements (as approved by DEP)

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GWR Routine and Triggered Monitoring Relationships

Two types of Source GWR Monitoring :

1. Routine WD and Source Water Monitoring (TCR)
2. Triggered Source Water Monitoring (applies to PWS if not performing 4 – Log Virus removal and positive Total Coliform from WD System under Rule 62-550.518)

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Triggered Source Water Monitoring

- Triggered source water monitoring requires “at-risk” systems to test wells for the presence of fecal indicators (*E. coli*, enterococci, or coliphage).
- When the triggered source water sample is positive for a fecal indicator, the water system must collect 5 additional source water samples within 24 hours unless immediate corrective action is required by the state.
- States may extend the 24 hour time limit on a case by case basis.
- Water systems must provide appropriate public notice. This is a Tier 1 Public Notice when a triggered source water sample is positive for a fecal indicator.

**Triggered
Source Water
Monitoring**

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Routine Source Water Monitoring and Triggering

- GWS that do not conduct Compliance Monitoring and are notified of a total coliform-positive routine sample must conduct the Triggered Source Water Monitoring.
- Triggered Monitoring
 - GWS must collect the additional 5 source water samples (wells) within 24 hours following the total coliform positive routine sample in the distribution system and analyze for the presence of fecal indicator .
 - GWS must analyze for presence of fecal indicator for each source (well) that is total coliform positive and in use.
 - Exemptions include DEP distribution system conditions and invalidation of fecal indicator-positive sample

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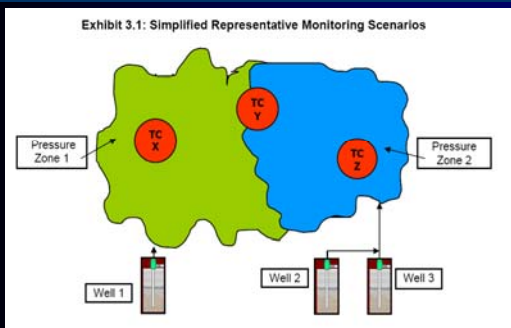
Special Conditions for Consecutive Systems

- Consecutive Systems must notify Wholesale System within 24 hours of being notified of TC+
- Wholesale must conduct Triggered Monitoring within 24 hours of being notified unless they provide 4 – Log Virus Inactivation

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Simplified Source Water Sampling for Multiple Wells



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Sampling Site Plans/ Representative Monitoring

- For systems that have more than one source of supply, a provision of the GWR will permit them to sample only those groundwater sources that are capable of supplying the location that had a positive sample result.
- This will require submission of a triggered source water monitoring plan and approval from DEP.

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Special DEP Requirements for Reducing Regulatory Burden of Source Monitoring for Small Systems*

- NCWS Serving < 1000 People with TC+
- Routine Source Water Sample can be considered as Triggered and Source Water repeat if analyzed for Fecal Coliform Indicator
- CWS Using Only GW Serving < 4900 People with TC+
- Routine Source Water Sample can be considered as Triggered Source Water if collected on the same day and if analyzed for Fecal Coliform Indicator

* See Van Hoofnagle Memo, 11/3/2009

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DEP Special Allowances for GWS with Combined Source Water Wells and CT Exclusion

- Acceptable Representative Sampling
- Where wells are combined prior to treatment, triggered sampling is permitted at combined location instead of source for Triggered Water Sample
 - Triggered Sampling at a location for only those wells active at the time of TC+ is permitted
 - Triggered Sampling of source wells that can be shown to hydrogeologically connected is permitted
 - CT may suffice for Triggered Monitoring Exemption; must be performed by PE and approved by DEP

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Actions for Total Coliform Positive Sample in Distribution System

1. Monitor all groundwater sources (wells) for fecal indicators
2. If fecal indicator not present in wells, fix Water Distribution problem
3. If fecal indicator present in well(s), repeat samples
4. If fecal indicator present in any repeat sample, then Corrective Action is triggered

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Corrective Actions

- Investigate, identify and correct any Significant Deficiencies

or

- Eliminate the source of contamination

or

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Implement Corrective Action Treatment Technologies (TT)

Corrective Actions are implementation of Treatment Technologies that are capable of providing at least a 4-log inactivation of viruses and include the following:

- 4 – Log Viral Inactivation (Chlorine, ozone)
- Virus Removal Treatment (Membrane technologies)
- Combination through alternative treatment technologies
- Provide Alternate Water Source

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The Sanitary Survey

- A comprehensive examination of a water system to identify potential sources of contamination
- Covers all ground water systems
- Frequency :
 - CWS every 3 years
 - CWS DEP option every 5 years if 4-Log Viral Inactivation
 - NCWS every 5 years

Sanitary Survey

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Eight (8) Specific Elements of the Sanitary Survey

1. Water Sources
2. Treatment Process
3. Distribution System Integrity
4. Finished Water Storage
5. Pumps, Pump Facilities, and Control
6. Monitoring, Reporting, and Data Verification
7. Water System Management and Operations
8. Water System Operator Compliance with State Requirements

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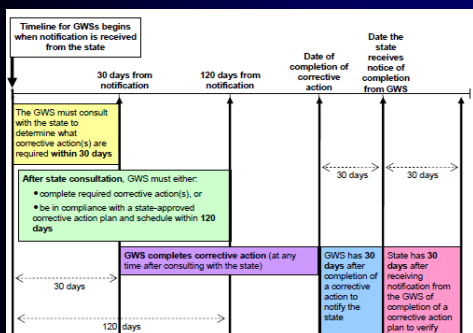
How the Sanitary Survey will Trigger Corrective Action under the GWR

- DEP will identify significant deficiencies (at any time), including deficiencies that may make a PWS susceptible to microbial contamination and may notify PWS within 30 days or the CWS has 30 days to consult with DEP
- DEP may specify Corrective Actions to be taken.
- PWS will fix significant deficiencies within 120 days of notification and notify DEP within 30 days of completing Corrective Action

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DEP Notification and CWS Compliance with San. Survey Significant Deficiency



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GWR Required Corrective Actions

- Correct significant deficiencies
- Provide an alternate source of water
- Eliminate source of contamination
- Provide treatment that achieves 4-log removal/inactivation of viruses
 - For most systems treatment will be Cl2 with designated contact time (mg – min / l)
- Generally last 3 apply to fecal indicator in source water

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Assessment Source Water Monitoring

- Changes to TCR, from TC - MCL Violation, to “Assessments”
- May be specified by DEP for sources that are at risk for fecal contamination
- Assessments Address:
 - Inadequacies in the sample sites, sampling or processing
 - Atypical events that may affect water quality
 - Changes in WD operations and maintenance
 - Source and treatment considerations
 - Existing water quality monitoring data

Assessment Source Water Monitoring

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Water System Assessments

Intended to identify sanitary defects, incorrect operational or monitoring practices and atypical events such as line breaks.

Level 1 Assessment

Trigger: ≥ 2 TC+ or no repeat Samples or $\geq 5\%$ TC+ for ≥ 40 samples

Level 2 Assessment

Trigger: E. coli MCL, monitoring violation or 2 “Level 1” / 12 mo.

- Conducted by PWS
- Reviewed by DEP
- Determined by DEP
- Performed by Operator > 2 yrs exp.

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Additional Source Water Monitoring

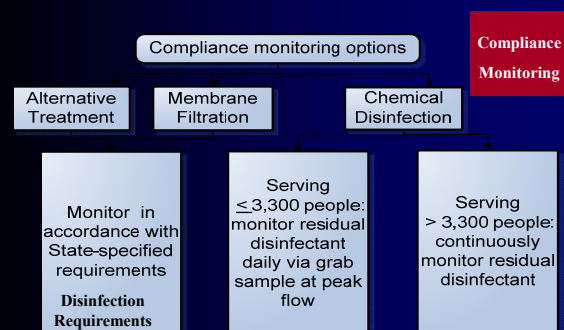
- DEP may use information collected through the Source Water Assessment Protection Program (SWAPP) for a hydrogeologic sensitivity assessment
- State determines whether a system’s wells are located in a sensitive aquifer type (karst, gravel, or fractured bed rock)
- State determines whether a hydrogeologic barrier is present that protects wells in a sensitive aquifer type

Additional Source Water Monitoring

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Three Compliance Monitoring Options



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Public Notification under the GWR for Tier Notices and CCRs

- Public Notification Rule requires PWS to provide notice to persons served by the water system for significant events
- Notification includes violations of primary (and secondary in Florida) drinking water standards and waterborne potential contamination emergencies
- The GWR amends the PN Rules by requiring notice for detection of fecal indicators in a ground water source sample, treatment technique violation and monitoring violations.
- Public Notice Requirements:
 - Presence of fecal indicators in source water
 - Significant deficiencies and correction

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Tiers Used in Public Notifications

Tier 1 (Immediate Notice within 24 hours)
Violations and situations that have significant potential to have serious and immediate adverse impacts on health for short-term (acute) exposure

Tier 2 (Notice within 30 days)
Violations and situations with the potential to have adverse effects on human health that do not pose immediate risk.

Tier 3 (Annual Notice)
Typically monitoring and reporting violations and are recorded in the Consumer Confidence Report due July 1st of every year.

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Public Notification for GWR Situations

Issue	Notification Required
Fecal indicator-positive ground water source sample CCR, and CCR ¹	Tier 1 PN, Special Notice in CCR
Failure to take corrective action	Tier 2 PN, CCR
Failure to maintain at least 4-log treatment of viruses	Tier 2 PN, CCR
Failure to meet monitoring requirements	Tier 3 PN, CCR
Uncorrected significant deficiency ²	Special Notice in CCR
Unaddressed fecal indicator-positive ground water source sample ³	Special Notice in CCR

1. Consecutive systems served by the ground water source must also notify the public.
2. Systems must continue to notify the public annually until the significant deficiency has been corrected.
3. Systems must put a notice in the CCR annually until the positive source water sample has been addressed.

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Triggered Monitoring Preparation

- Contact your certified laboratory and inform them of the new rule.
- Establish a plan to conduct source sampling **IN ADVANCE**. Does the sample collector have the ability to collect source samples (knowledge, accessibility)? Are there taps installed that will facilitate the monitoring.....

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Treatment

- GWSs that maintain 4-log Viral Inactivation and/or removal of viruses are exempt from the monitoring provisions of the GWR.
- Systems must demonstrate to the DEP that the treatment meets this level.
- Currently, a written notification to DEP that 4-Log virus treatment is being contemplated and 4 – Log demonstration must be prepared under the responsible charge of a PE (DEP *Floridan*)
- 4 – Log Viral Inactivation requires DEP approval and must be reported monthly

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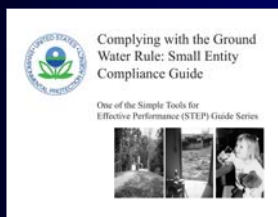
Achieving 4 – Log Viral Inactivation

- There are several ways to achieve 4-log Inactivation of Viruses:
- Adequate chlorination or ozonation (Cl⁻ CT of ≈ 6 mg – min / l for 10° C, O³ CT of ≈ 1)
- Combination of treatments that total 4-logs (UV+chlorine, membrane filtration+ UV, UV+UV+UV).

4 – Log Viral Inactivation will be discussed in another presentation

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GWR Information is available from EPA



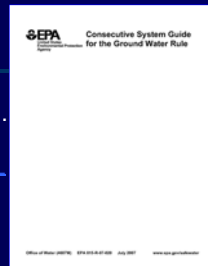
<http://www.epa.gov/safewater/disinfection/gwr/index.html>

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Consecutive Systems and Wholesalers

- ◆ Consecutive systems should consult the following guidance.....
http://www.epa.gov/safewater/disinfection/gwr/pdfs/guide_gwr_consecutive-guidance.pdf
 (EPA 815-R-07-020)



- Consecutive systems and wholesalers that use GW sources should interact prior to the Rule to ensure that notifications and sampling occur within the required timeframes.

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What Can be done Now?

- Read the EPA and DEP Guidance Documents
- Have GWSs correct the violations identified at the most recent sanitary survey. This will minimize the impact of the GWR when it takes effect on Dec. 1, 2009.

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