

# Critical Aquifer Recharge Areas Review

## Groundwater Quality Standards

CARA Review Committee Meeting 2  
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# Presentation Outline

- Project overview
- Conceptual model
- Groundwater standards
- Applying groundwater standards to CARA review



# CARA Study Objectives

- Evaluate the need for revisions of the Critical Aquifer Recharge Areas (CARA) wastewater disposal standard (SCC 11.20.75)
  - Non-residential and outside the Urban Growth Area (UGA)
  - Is the standard effective, enforceable, and equitable?
- Make recommendations for standard revisions (if appropriate)

# Why a Standard?

## History of Aquifer Protection

### Growth Management Act (GMA) 1990

- Required to identify, designate, and protect critical areas, including CARA

### 1979 Spokane Aquifer Water Quality Management Plan Sole Source Aquifer Protection Program

*Critical Areas Ordinance for the Protection of Wetlands, Fish and Wildlife Habitats, Geo-hazard Areas and Critical Aquifer Recharge Areas* (implemented by SCC 11.20.010 through 11.20.090)

Adopted 1996, amended 2003 and 2008

# Critical Aquifer Recharge Areas

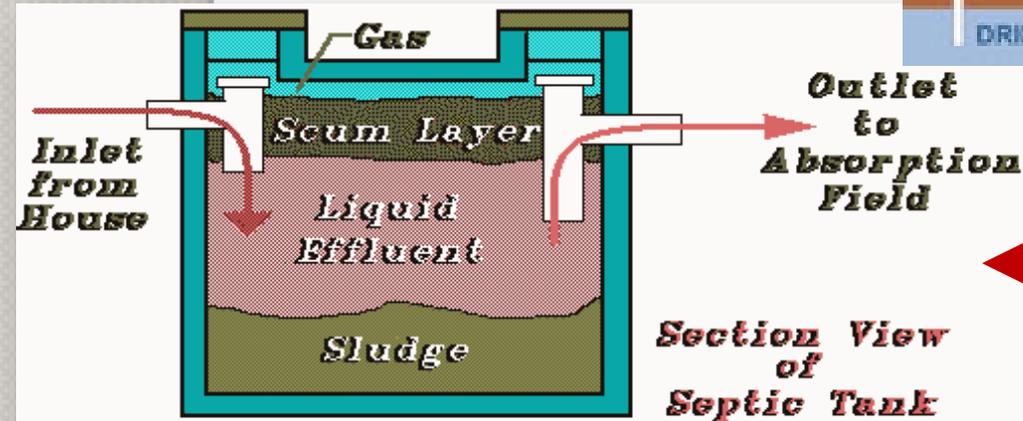
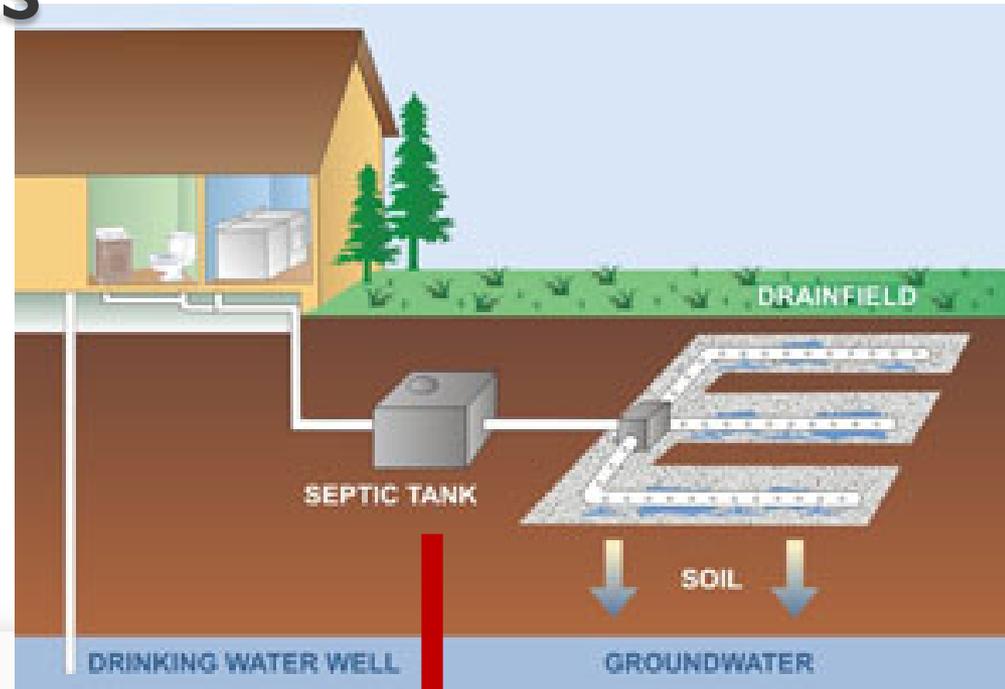
## SCC 11.20.075

1. Prevent degradation of groundwater quality in Spokane County and improve water quality of aquifers that do not meet state standards
2. Protect groundwater quality from development impacts.
3. Secure adequate water quantity for the residents of Spokane County
4. Provide public information programs for land users to demonstrate how to protect CARA from degradation
5. Consistently enforce regulations, effectively monitor compliance and provide incentives to protect CARA
6. Regularly update CARA protection measures so they are effective, enforceable, and equitable

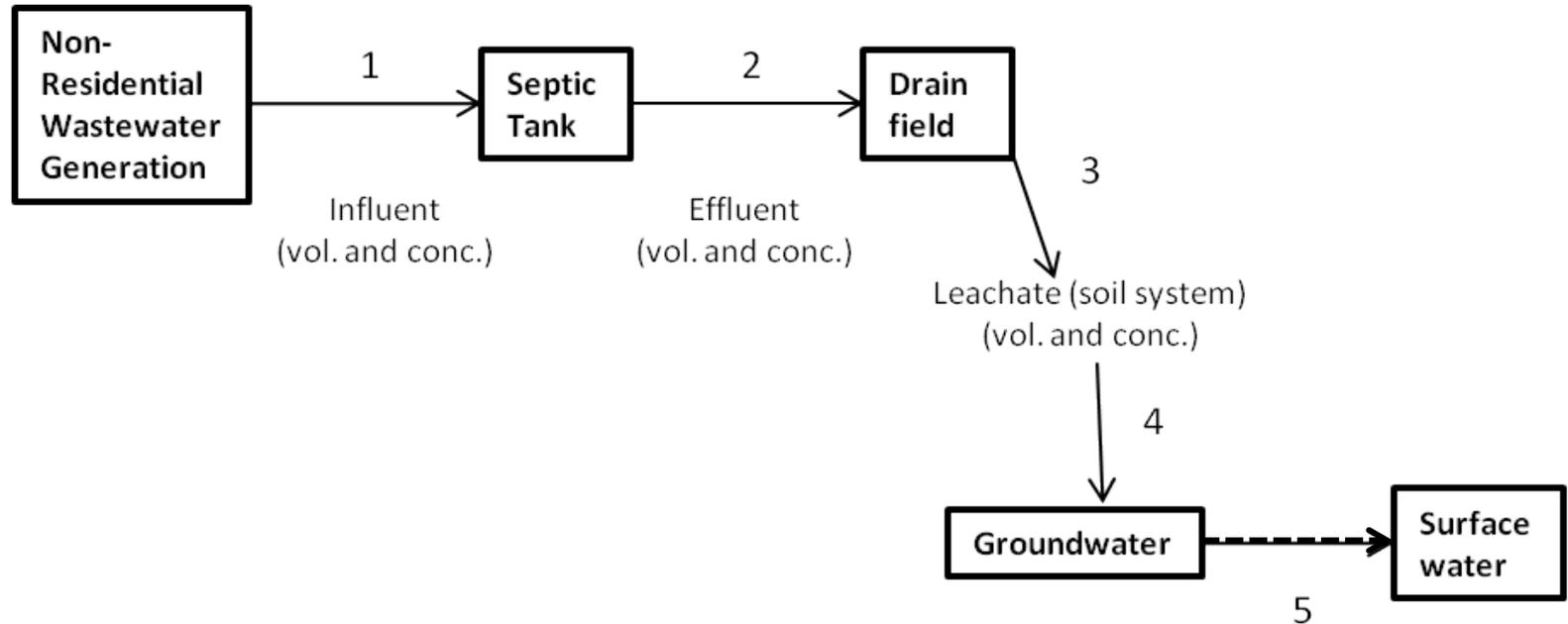
Technical Memorandum #2 focuses on  
Groundwater Quality Standards to meet Goals 1 and 2

# On-Site Septic System Components

- Conventional system
  - Septic tank
  - Drainfield



# On-Site Septic System Flow Pattern



Groundwater Quality Standards –  
*Water Quality Standard for Ground Water of the  
State of Washington (Chapter 173-200 WAC)*

# Groundwater Standards

- Standards set in WAC 173-200
  - Described by Ecology in *Implementation Guidance for the Groundwater Quality Standard*
- Applicability
  - All activities with potential to alter groundwater quality
  - All aquifers; all groundwater is a potential drinking water source
  - Everywhere in the state

# Groundwater Standards Regulatory Authority

- Implementation and enforcement of groundwater standards are the responsibility of permitting agencies



# On-Site Septic System

## Division of Regulatory Authority

- Spokane Regional Health District
  - Systems  $\leq$  3,499 gallons/day
- Washington State Department of Health
  - Systems from 3,500 to 100,000 gallons/day
  - Approves tank system design
- Washington State Department of Ecology
  - Wastewater facilities
  - Systems  $>$  100,000 gallons/day
  - Systems with groundwater connection to surface water
  - All industrial wastewater, combined stormwater, and evaporative lagoons

# Groundwater Quality Standards Goals and Mechanisms

- Goals
  - Maintain existing high quality groundwater
  - Protect beneficial uses
- Mechanisms
  - Anti-degradation:
    - Prevent degradation that harms beneficial uses or violates standards
  - AKART
    - Require the use of **a**ll **k**nown, **a**vailable, and **r**easonable methods of prevention, control and **t**reatment
  - Standards and Point of Compliance
    - Enforce narrative and numeric standards for human health and welfare

# Anti-degradation

- Beneficial uses shall be maintained and protected
- Groundwater of a higher quality than the criteria shall be protected

# AKART

- Meet design requirements defined in
  - WAC Chapter 246-272A – *On-Site Sewage Systems* (e.g., system parameters)
  - WAC Chapter 246-272C – *On-Site Sewage System Tanks Regulations* (e.g., tank design)
- Obtain Spokane Regional Health District or Washington Department of Health permit

# Standards and Point of Compliance

- *As near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible*  
*WAC 173-200-060(1)*
- Interpret as
  - Directly below the drainfield
  - At the property boundary

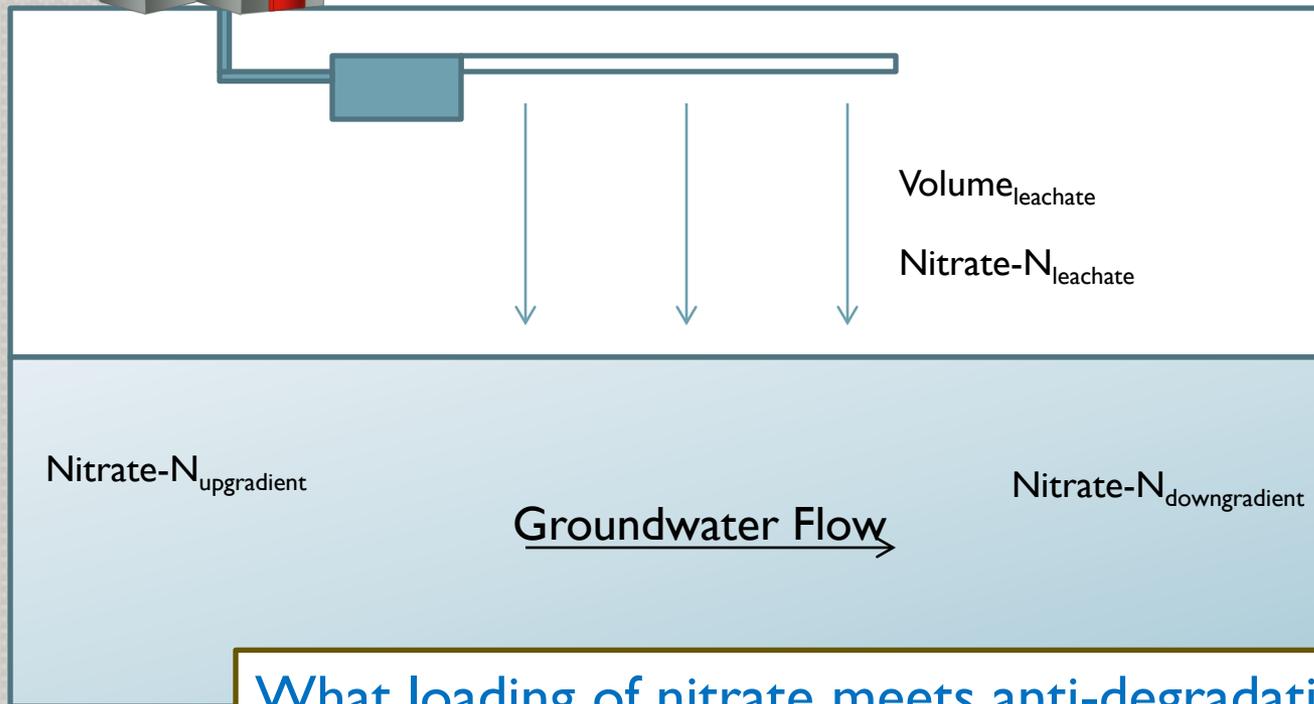
# Constituent Focus:

## Nitrate

- Drinking water standard established for nitrate
- Groundwater is a potential drinking water source
- Mobile in groundwater
- Representative of human impacts to groundwater, i.e., high concentrations in septic systems

Phosphorus also a constituent of focus and will be addressed in next technical memorandum

# On-Site Septic System Loading to Groundwater: Nitrate



What loading of nitrate meets anti-degradation policy?

- WDOH has set precedence for on-site treatment systems  
Nitrate-Balance Approach

# Groundwater Standard Application

Implementation Mechanism	CARA Study
Anti-degradation	<p>Upgradient nitrate-N <math>\leq 3.0</math> mg/L; then allow a 2.0 mg/L increase at point of compliance</p> <p>Upgradient nitrate-N <math>&gt; 3.0</math> to <math>\leq 5.0</math> mg/L; then allow an increase up to 5.0 mg/L at point of compliance</p> <p>Upgradient nitrate-N <math>&gt; 5.0</math> mg/L and <math>\leq 10.0</math> mg/L ; then allow a 0.1 mg/L increase at point of compliance.</p> <p>Upgradient nitrate-N <math>&gt; 10.0</math> mg/L; then no measureable increase allowed</p>
AKART	<p>On-site sewage treatment systems meet AKART by being permitted and meeting the design requirements outlined in Chapter 246-272A WAC – <i>On-Site Sewage Systems</i> and Chapter 246-272C WAC – <i>On-Site Sewage System Tanks Regulations</i></p>
Standards	<p>The on-site treatment system shall not result in groundwater nitrate-N exceeding 10 mg/L (in addition the anti-degradation policy and AKART must be met)</p>
Point of Compliance	<p>Point of compliance is directly downgradient of the drainfield, but alternative would be end of property</p>

# Comments?

