

Critical Aquifer Recharge Areas Review

CARA Review Process and Milestones
Review Current CARA Non-residential Requirements
Overview of Study Area Characteristics

CARA Review Committee Meeting I
October 24, 2012

Mike Murray, PhD, HDR
Michael Kasch, PE, PH, HDR

CARA Study Objectives

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

CARA Study Approach

- Technical evaluations - 10 tasks
- Technical memorandums - 4 memos and final report
- CARA Review Committee – 4 meetings and reviews

See project flow chart



Background

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)
- Adapted 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.

Uses and Activities Regulated in CARA (SCC 11.20.075, Table 11.20.075B)

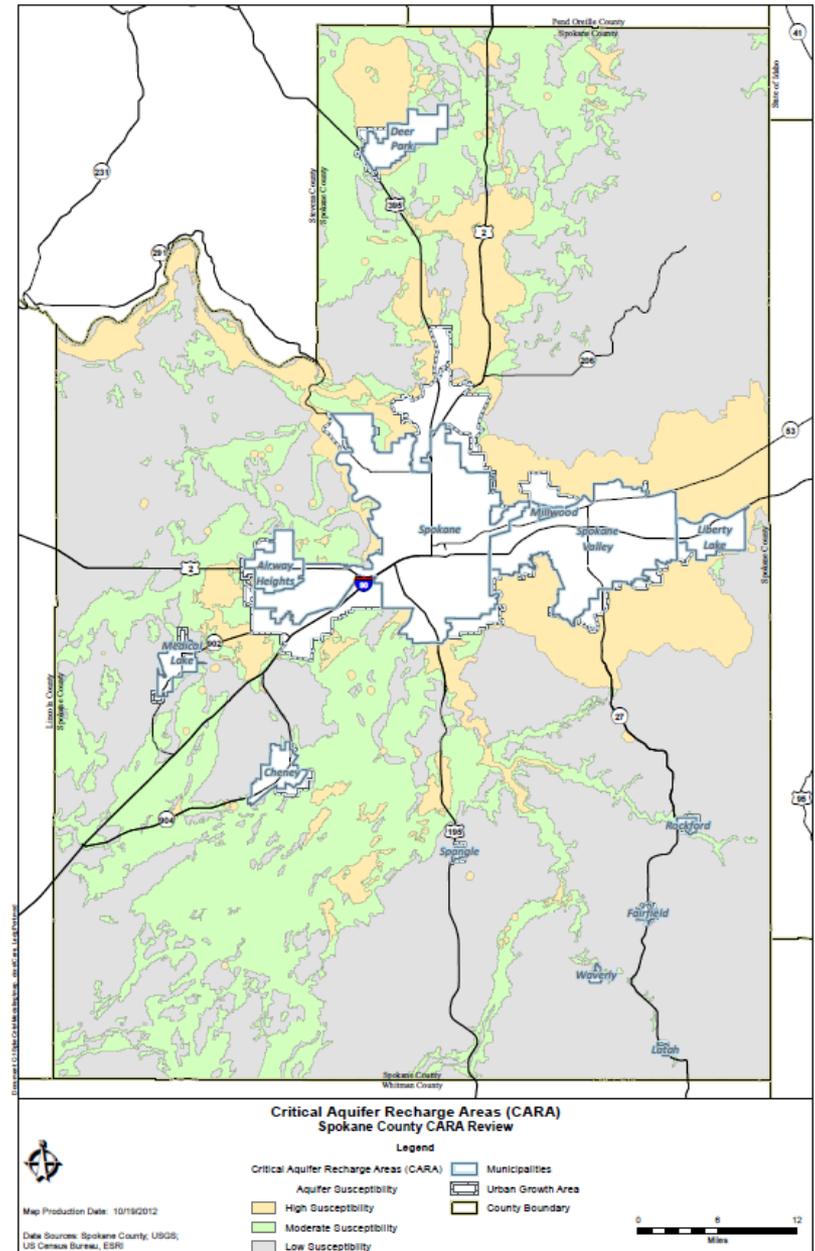
Uses and Activities	Aquifer Susceptibility Rating		
	High***	Moderate	Low
Biosolids land application	N	L-1	L-1
Critical Material storage, handling, generating or use	L-2, L-3	L-2, L-3	L-2, L-3 **
Cultivation of land (commercial)	L-1	L-1	P
Dairy	L-1*	L-1	L-1
Feed lot	N	L-1	L-1
Feed mill	L-2	L-2	P
Floriculture (flower growing)	L-1	L-1	P
Grazing	L-1	L-1	P
Greenhouse – commercial	L-1	L-1	P
Horse boarding and training	L-1	L-1	P
Horticulture (vegetable growing)	L-1	L-1	P
Landfill, demolition, inert	N	L-6	L-6
Landfills (all others)	N	N	L-6
Large Animal raising and/or keeping	L-1	L-1	P
Mining	L-5	L-5	L-5
Nursery – wholesale	L-1	L-1	P
Orchard	L-1	L-1	P
Poultry-raising, commercial	N	L-1	L-1
Riding stable	L-1	L-1	P
Sanitary waste discharge	L-3	L-3	P
Stormwater disposal systems	L-4	L-4	L-4
Tree farming	L-1	L-1	P
Truck gardening	L-1	L-1	P
Vineyard	L-1	L-1	P

N = not permitted; P = permitted; L = limited use (for # description see code)

CARA

Susceptibility

- Orange = High
- Green = Moderate
- Gray = Low



Performance Standards for Wastewater Disposal for High and Moderate CARA outside UGA Boundary

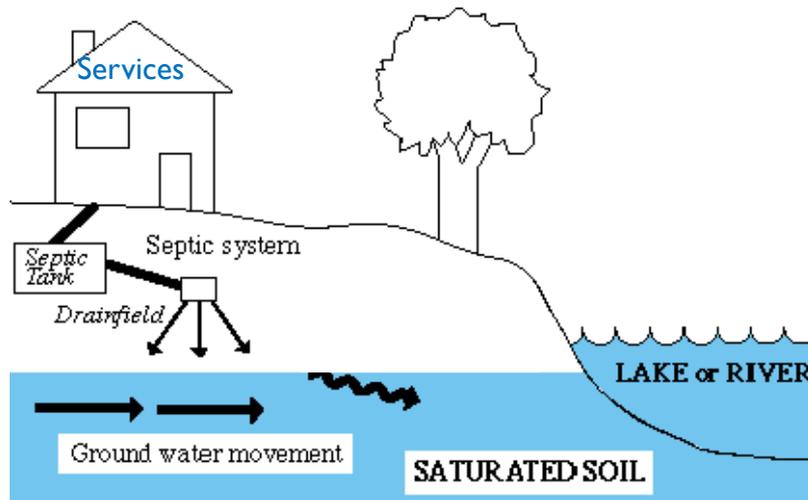
- *Nonresidential uses and activities in moderate and high susceptibility areas that produce more than 90 gallons of wastewater per acre, per day, and any Critical Material Use Activity that produces sanitary wastewater discharge, shall have a disposal system that protects the aquifer equal to or greater than one of the following..... (see Attachment A of Tech Memo 1)*

Performance Standards Cont.

- Assumed non-residential land use (excluding Critical Material Use Activity) similar to residential wastewater
- Assumed 150 gallons/day/person discharge (1996)
- Assumed 3 persons/dwelling:
 - $150 \text{ gpd} \times 3 = 450 \text{ gpd}$
- Density restriction outside UGA¹:
 - 1 unit/5 acres
- $450 \text{ gpd}/5 \text{ acres} = 90 \text{ gpd/acre}$

¹One dwelling per 5-acres protective of sensitive aquifers based on IPHD and WI research.

CARA Review Approach



Tasks:

- a) **Define study area¹**
- b) **Define non-residential uses**
- c) **Define non-residential sanitary wastewater characteristics**
- d) **Define environ/resource properties**
- e) Define groundwater criteria
- f) Analyze mixing zone
- g) Determine soil loadings
- h) Determine sanitary wastewater loadings
- i) Develop predictive tools
- j) Recommendations

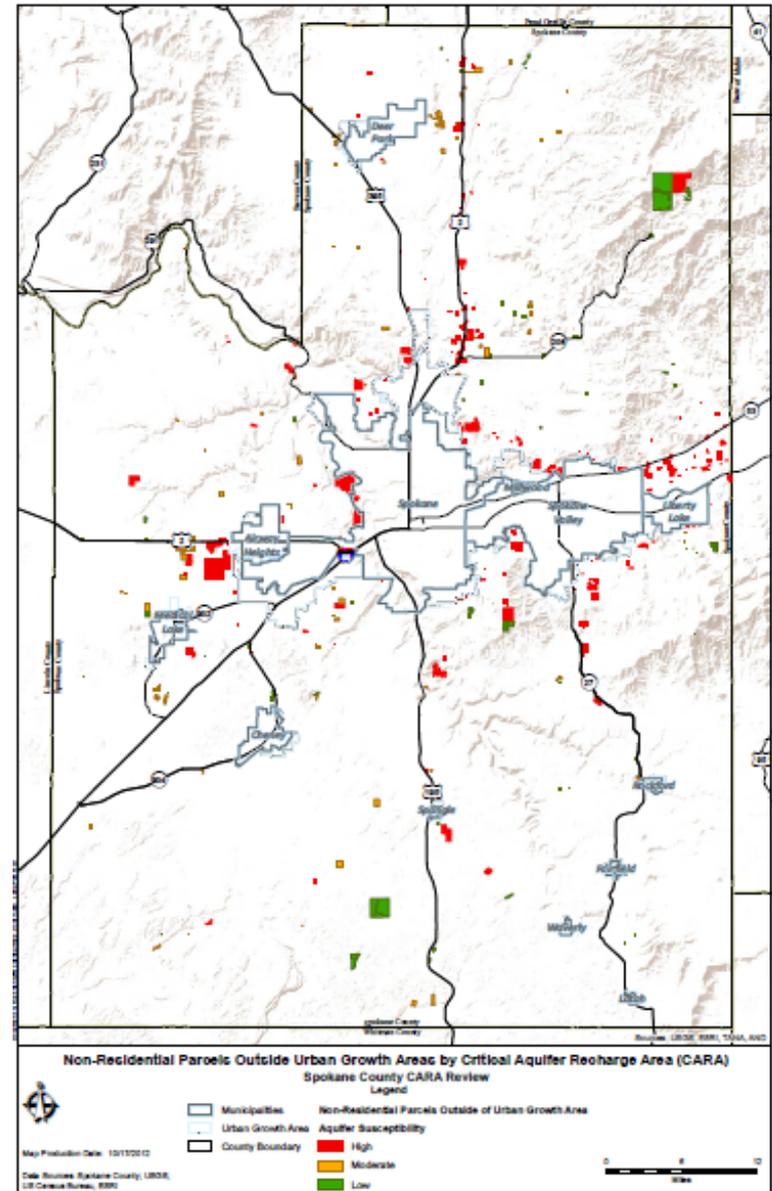
¹Bold indicates Technical Memorandum #1

Study Area

- Current Non-residential
- Outside UGA

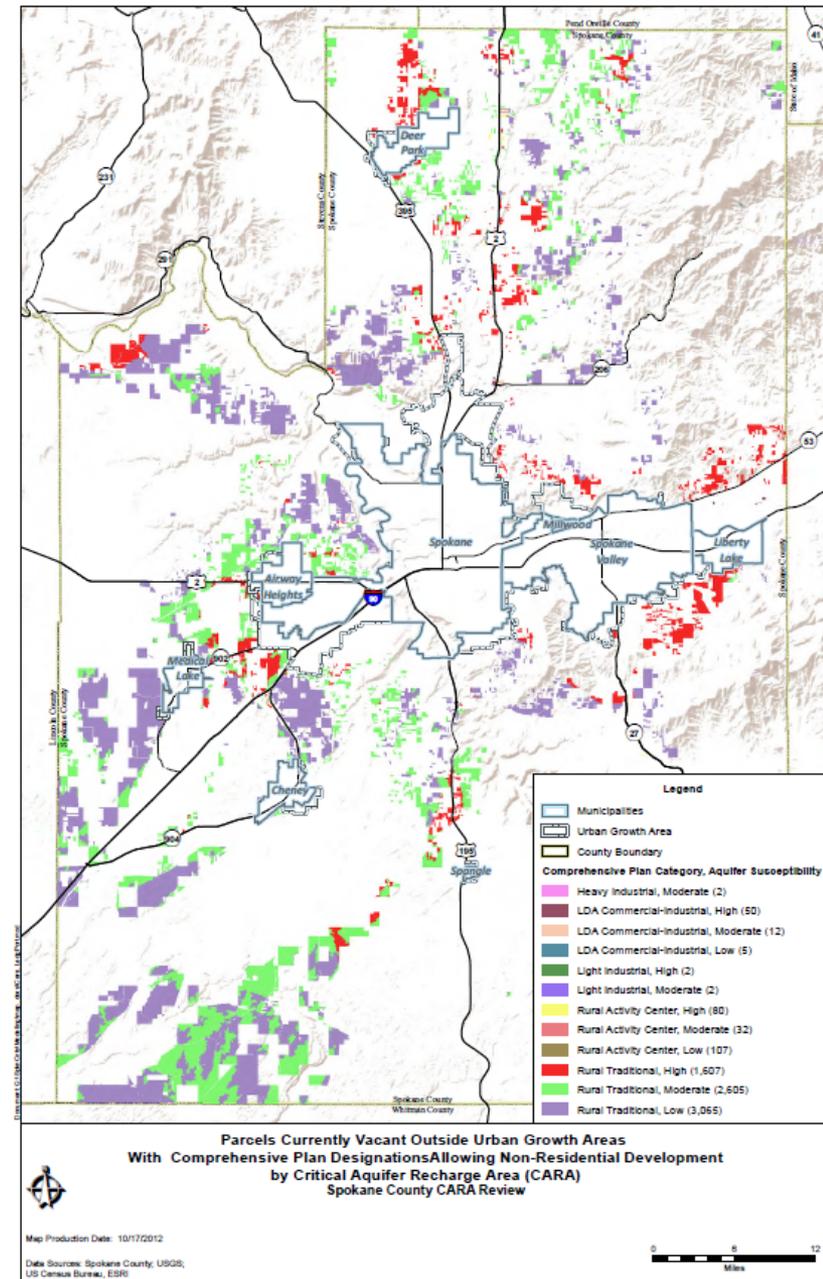
Susceptibility:

- Red = High
- Orange = Moderate
- Green = Low



Study Area

- Potential Future Non-residential
- Outside UGA



Define Non-residential Uses

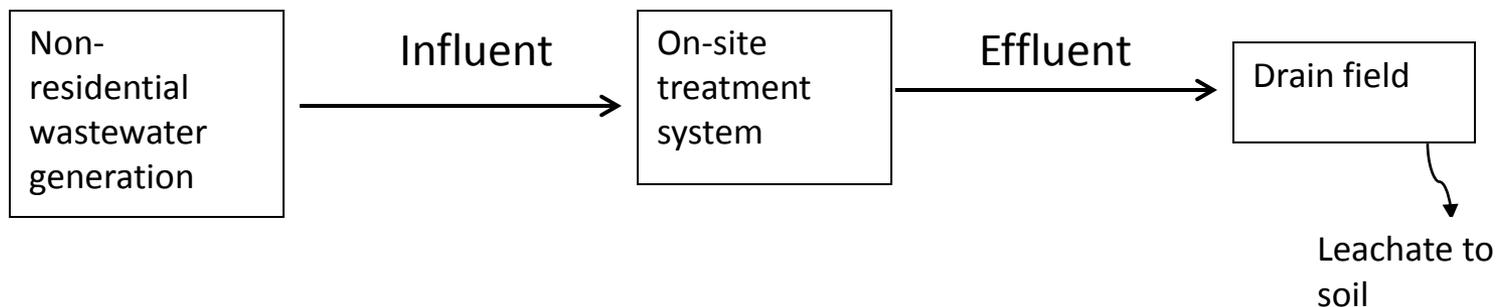
Land Use
Agricultural – commercial
Churches
Commercial
Communication
Education
Hotel/Condo
Manufacturing – chemical
Manufacturing – petroleum
Manufacturing – stone/glass
Manufacturing – others
Mining – sand and gravel
Public assembly
Recreation
Resort camping
Retail – auto
Retail – eating
Retail – food
Retail – general merchandise
Retail – hardware
Retail Other
Service – construction
Service – education
Service – finance
Service – governmental
Service – professional
Service – miscellaneous
Service - repair
Timber
Transportation – aircraft
Transportation – motor
Transportation – railroad
Utilities
Wholesale

Residential Development (SCC 11.20010) -
 Only single-family, two family, multifamily,
 manufactured and mobile home,
 community residential treatment facility,
 dormitory, fraternity/sorority

(no definition of non-residential in SCC)

Define Non-residential Sanitary Wastewater Characteristics

- Challenges:
 - Residential v. Non-residential
 - Influent v. Effluent
 - Constituents limited

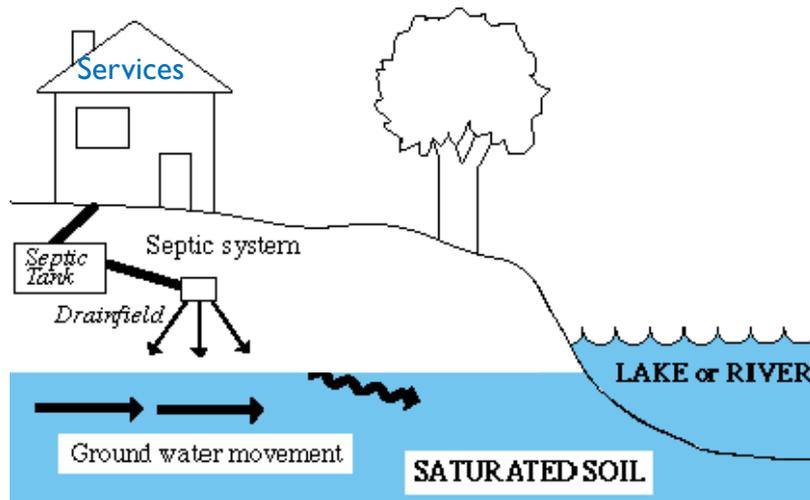


Example Septic Tank Effluent Concentrations

Type	BOD ₅ (mg/L)			TN (mg/L)			TP (mg/L)		
	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
Residential	13	184	1,211	10	51	330	3	9	48
Restaurants	53	909	1,216	-	41	-	-	8	-
Middle and High Schools	70	179	599	80	104	141	3	12	18
Supermarkets	164	500	883	39	88	189	-	29	-

Based on CT Study, Septic Tank Effluent

Define Environmental/Resource Properties for Area of Study

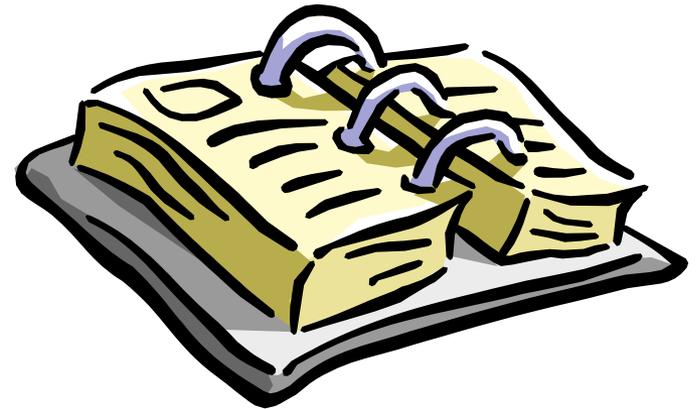


- Soils
- Vadose zone geology
- Depth to groundwater
- Aquifer identification
- Aquifer gradient
- Aquifer flow direction
- Aquifer thickness
- Aquifer hydraulic conductivity
- Surface water distance
- Groundwater quality for key constituents
- Aquifer/surface water discharge

What's next?

Tasks:

- a) Define study area
- b) Define non-residential Uses
- c) Define non-residential sanitary wastewater characteristics
- d) Define environ/resource properties
- e) **Define groundwater criteria**
- f) Analyze mixing zone
- g) Determine soil loadings
- h) Determine sanitary ww loadings
- i) Develop predictive model
- j) Recommendations



Questions?

