

MANAGE Nutrient loading and Hydrologic Assumptions

Chepachet wellhead protection areas - MANAGE Inputs

Hydrologic and surface runoff nutrient loading assumptions:

Average Annual Precipitation	45.0 inches
Average Annual Evapotranspiration	18.0 inches

Surface Runoff Coefficients	Nutrient Loading Factors					
	Phosphorus		Nitrogen			
	lb P/acre/year	lb N/acre/year	Low	High	Low	High
LAND USE	Low	High	Low	High	Low	High
[1] HD Res.(>8 /ac)	0.64	0.77	3.6	4.4	11.9	14.3
[2] MHD Res.(4-7.9/ac)	0.39	0.64	2.2	3.6	7.3	11.9
[3] MD Res.(1-3.9/ac)	0.23	0.39	1.3	2.2	4.3	7.3
[4] MLD Res.(0.5-0.9/ac)	0.16	0.23	0.9	1.3	3.0	4.3
[5] LD Res.(<0.5/ac)	0.10	0.16	0.6	0.9	1.9	3.0
[6] Commercial	0.50	0.85	1.0	2.5	2.0	20.0
[7] Industrial	0.50	0.85	1.0	3.5	2.0	15.0
[8] Roads	0.70	0.82	1.0	3.5	2.0	20.0
[9] Airports	0.70	0.82	1.0	3.5	2.0	20.0
[10] Railroads	0.70	0.82	1.0	3.5	2.0	20.0
[11] Junkyards	0.70	0.82	1.0	3.5	2.0	20.0
[12] Recreation	0.10	0.30	0.5	1.5	1.5	4.0
[13] Institution	0.39	0.64	2.2	3.6	7.3	11.9
[14] Pasture	0.05	0.25	0.3	1.0	2.0	5.5
[15] Cropland	0.15	0.50	0.5	4.5	4.0	50.0
[16] Orchards	0.05	0.25	0.4	2.0	4.0	35.0
[17] Brush	0.00	0.10	0.1	0.2	0.9	2.9
[18] Forest	0.00	0.10	0.1	0.2	0.9	2.9
[19] Barren	0.05	0.80	0.1	0.2	0.9	2.9
[20] Wetland	0.00	0.10	0.0	0.0	0.0	0.0
[21] Water	1.00	1.00	0.3	0.3	8.0	8.0

Groundwater nutrient loading assumptions:

Septic Systems:

Factors determining septic tank effluent characteristics

	2.4	people/dwelling unit
	50	gallons H ₂ O /person/day
	2.3	lb P/person/year
	7.0	lb N/person/year
Concentration of P	15.1	mg/l
Concentration of N	46.0	mg/l

90% of the N in the septic effluent leaches to the groundwater

Estimated Septic System Density in Unsewered Areas

LAND USE	Number of Dwelling Units/Acre	= number of septic systems/acre
[1] HD Res.(>8 /ac)	8.00	
[2] MHD Res.(4-7.9/ac)	3.60	
[3] MD Res.(1-3.9/ac)	1.00	
[4] MLD Res.(0.5-0.9/ac)	0.50	
[5] LD Res.(<0.5/ac)	0.20	
[6] Commercial**	1.00	** Commercial, Industrial and Institution are
[7] Industrial**	1.00	assumed to contribute at the same level as MD Res.
[12] Recreation **	0.50	Recreation is also treated as MD Res., but it is assumed
[13] Institution**	1.00	to be in use for 6 months out of the year.

Fertilizers:

Lawn Fertilizers

Estimated Lawn Area by Land Use

LAND USE	Fraction of area which is lawn	
[1] HD Res.(>8 /ac)	0.25	75% of residents and businesses apply fertilizer
[2] MHD Res.(4-7.9/ac)	0.35	at a rate of 175 lb N/ac/yr
[3] MD Res.(1-3.9/ac)	0.50	or 4.0 lb N/1000 sq. ft./yr
[4] MLD Res.(0.5-0.9/ac)	0.35	6% of the N applied leaches
[5] LD Res.(<0.5/ac)	0.25	to the groundwater
[6] Commercial	0.05	
[7] Industrial	0.10	
[12] Recreation	0.70	
[13] Institution	0.25	

Agricultural Fertilizers

Agricultural fertilizer applied at a rate of **215** lb N/ac/yr
or 4.9 lb N/1000 sq. ft./yr.

30% of the nitrogen applied leaches to the groundwater.

Other:

Pets in Residential Areas

0.41 lb N/person/yr leaches to the groundwater from pet waste.

Unfertilized Pervious Areas

1.2 lb/acre/yr leaches to the groundwater from unfertilized lawns, pastures, forests, and brush areas (background level).

Study Area:	Chepachet WHPAs	
Scenario:	Current Land Use	
<u>ESTIMATED IMPERVIOUSNESS</u>		
Average over Study Area	14%	
Average over Riparian Area	11%	
Chepachet WHPAs		
Current Land Use		
<u>LAND USE CATEGORY</u>	<u>Total Acres</u>	<u>% Impervious</u>
[1] HD Res.(>8 / ac)	6.1	72
[2] MHD Res.(4-7.9/ac)	68.5	50
[3] MD Res.(1-3.9/ac)	173.4	30
[4] MLD Res.(0.5-0.9/ac)	4.2	16
[5] LD Res.(<0.5/ac)	1.6	8
[6] Commercial	55.8	72
[7] Industrial	0.0	72
[8] Roads	0.0	72
[9] Airports	0.0	72
[10] Railroads	0.0	72
[11] Junkyards	8.3	72
[12] Recreation	30.0	10
[13] Institution	17.5	50
Total Developed Areas	365.4	
All Other Pervious Areas	697.7	
Total Watershed Area	1063.1	14%