iemiscdata: Viewing Tables & Their Associated Notes

Irucka Embry, E.I.T. (EcoC²S)

2023-09-25

Contents

Table 2-1: Runoff depth for selected CN's and rainfall amounts & notes

```
install.load::load_package("iemiscdata", "pander")
# load needed packages using the load_package function from the install.load
# package (it is assumed that you have already installed these packages)

data(runoff_depth)
data(runoff_depth_notes)
# load the data from iemiscdata (containing

pander(runoff_depth)
```

Table 1: Table continues below

Rainfall (in)	Runoff depth (in) for curve number of 40	Runoff depth (in) for curve number of 45
1	0	0
1.2	0	0
1.4	0	0
1.6	0	0
1.8	0	0
2	0	0
2.5	0	0
3	0	0.02
3.5	0.02	0.08
4	0.06	0.18
4.5	0.14	0.3
5	0.24	0.44
6	0.5	0.8
7	0.84	1.24
8	1.25	1.74
9	1.71	2.29
10	2.23	2.89
11	2.78	3.52
12	3.38	4.19
13	4	4.89
14	4.65	5.62
15	5.33	6.36

Table 2: Table continues below

Runoff depth (in) for curve number of 50	Runoff depth (in) for curve number of 55
0	0
0	0
0	0
0	0
0	0
0	0.02
0.02	0.08
0.09	0.19
0.2	0.35
0.33	0.53
0.5	0.74
0.69	0.98
1.14	1.52
1.68	2.12
2.25	2.78
2.88	3.49
3.56	4.23
4.26	5
5	5.79
5.76	6.61
6.55	7.44

Runoff depth (in) for curve number of 50	Runoff depth (in) for curve number of 55
7.35	8.29

Table 3: Table continues below

Runoff depth (in) for curve number of 60	Runoff depth (in) for curve number of 65
0	0
0	0
0	0.02
0.01	0.05
0.03	0.09
0.06	0.14
0.17	0.3
0.33	0.51
0.53	0.75
0.76	1.03
1.02	1.33
1.3	1.65
1.92	2.35
2.6	3.1
3.33	3.89
4.1	4.72
4.9	5.56
5.72	6.43
6.56	7.32
7.42	8.21
8.3	9.12
9.19	10.04

Table 4: Table continues below

Runoff depth (in) for curve number of 70	Runoff depth (in) for curve number of 75
0	0.03
0.03	0.07
0.06	0.13
0.11	0.2
0.17	0.29
0.24	0.38
0.46	0.65
0.71	0.96
1.01	1.3
1.33	1.67
1.67	2.05
2.04	2.45
2.81	3.28
3.62	4.15
4.46	5.04
5.33	5.95
6.22	6.88
7.13	7.81

Runoff depth (in) for curve number of 70	Runoff depth (in) for curve number of 75
8.05	8.76
8.98	9.71
9.91	10.67
10.85	11.63

Table 5: Table continues below

Runoff depth (in) for curve number of 80	Runoff depth (in) for curve number of 85
0.08	0.17
0.15	0.27
0.24	0.39
0.34	0.52
0.44	0.65
0.56	0.8
0.89	1.18
1.25	1.59
1.64	2.02
2.04	2.46
2.46	2.91
2.89	3.37
3.78	4.3
4.69	5.25
5.63	6.21
6.57	7.18
7.52	8.16
8.48	9.13
9.45	10.11
10.42	11.1
11.39	12.08
12.37	13.07

Table 6: Table continues below

Runoff depth (in) for curve number of 90	Runoff depth (in) for curve number of 95
0.32	0.56
0.46	0.74
0.61	0.92
0.76	1.11
0.93	1.29
1.09	1.48
1.53	1.96
1.98	2.45
2.45	2.94
2.92	3.43
3.4	3.92
3.88	4.42
4.85	5.41
5.82	6.41
6.81	7.4

Runoff depth (in) for curve number of 90	Runoff depth (in) for curve number of 95
7.79	8.4
8.78	9.4
9.77	10.39
10.76	11.39
11.76	12.39
12.75	13.39
13.74	14.39

Runoff depth (in) for curve number of 98
0.79
0.99
1.18
1.38
1.58
1.77
2.27
2.77
3.27
3.77
4.26
4.76
5.76
6.76
7.76
8.76
9.76
10.76
11.76
12.76
13.76
14.76

```
pander(runoff_depth_notes)
```

Note Number (*)	Notes
1	Interpolate the values shown to obtain runoff depths for CN's or rainfall amounts not shown. {Table 2-1: Runoff depth for selected CN's and rainfall amounts *1}

Table 2-2a: Runoff curve numbers for urban areas & notes

```
data(cn_urban)
data(cn_urban_notes)
```

```
# load the data from iemiscdata (containing Table 2-2a: Runoff curve numbers
# for urban areas & notes)

pander(cn_urban)
```

Table 9: Table continues below

Cover type and hydrologic condition	Average percent impervious area *2
Fully developed urban areas (vegetation established)	NA
Open space (lawns, parks, golf courses, cemeteries, etc.) *3	NA
Poor condition (grass cover < 50%)	NA
Fair condition (grass cover 50% to 75%)	NA
Good condition (grass cover > 75%)	NA
	NA
Impervious areas:	NA
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	NA
	NA
Streets and roads:	NA
Paved; curbs and storm sewers (excluding right-of-way)	NA
Paved; open ditches (including right-of-way)	NA
Gravel (including right-of-way)	NA
Dirt (including right-of-way)	NA
	NA
Western desert urban areas:	NA
Natural desert landscaping (pervious areas only) *4	NA
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)	NA
	NA
Urban districts:	NA
Commercial and business	85
Industrial	72
Residential districts by average lot size:	NA
1/8 acre or less (town houses)	65
1/4 acre	38
1/3 acre	30
1/2 acre	25
1 acre	20
2 acres	12
	NA
Developing urban areas	NA
Newly graded areas (pervious areas only, no vegetation) *5	NA
	NA
Idle lands (CN's are determined using cover types similar to those in table 2-2c: Runoff curve numbers for other agricultural lands).	NA

Table 10: Table continues below

Curve numbers for hydrologic soil group A	Curve numbers for hydrologic soil group B
NA	NA
NA	NA
68	79
49	69
39	61
NA	NA
NA	NA
98	98
NA	NA
NA	NA
98	98
83	89
76	85
72	82
NA	NA
NA	NA
63	77
96	96
NA	NA
NA	NA
89	92
81	88
NA	NA
77	85
61	75
57	72
54	70
51	68
46	65
NA	NA
NA	NA
77	86
NA	NA
NA	NA

Curve numbers for hydrologic soil group C	Curve numbers for hydrologic soil group D
NA	NA
NA	NA
86	89
79	84
74	80
NA	NA
NA	NA
98	98
NA	NA
NA	NA
98	98
92	93
89	91

Curve numbers for hydrologic soil group C	Curve numbers for hydrologic soil group D
87	89
NA	NA
NA	NA
85	88
96	96
NA	NA
NA	NA
94	95
91	93
NA	NA
90	92
83	87
81	86
80	85
79	84
77	82
NA	NA
NA	NA
91	94
NA	NA
NA	NA

```
pander(cn_urban_notes)
```

Note Number (*)	Notes
1	Average runoff condition, and Ia = 0.2S. {Table 2-2a: Runoff curve numbers for urban areas *1}
2	The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.
3	CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
4	Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

Note Number (*)	Notes
5	Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b: Runoff curve numbers for cultivated agricultural lands & notes

```
data(cn_agricultural)
data(cn_agricultural_notes)
# load the data from iemiscdata (containing Table 2-2b: Runoff curve numbers
# for cultivated agricultural lands & notes)


pander(cn_agricultural)
```

Table 13: Table continues below

Cover type	Treatment *2
Fallow	Bare soil
Fallow	Crop residue cover (CR)
Fallow	Crop residue cover (CR)
Row crops	Straight row (SR)
Row crops	Straight row (SR)
Row crops	SR + CR
Row crops	SR + CR
Row crops	Contoured (C)
Row crops	Contoured (C)
Row crops	C + CR
Row crops	C + CR
Row crops	Contoured & terraced (C&T)
Row crops	Contoured & terraced (C&T)
Row crops	C&T+ CR
Row crops	C&T+ CR
Small grain	SR
Small grain	SR
Small grain	SR + CR
Small grain	SR + CR
Small grain	C
Small grain	C
Small grain	C + CR
Small grain	C + CR
Small grain	C&T

Cover type	Treatment *2
Small grain	C&T
Small grain	C&T+ CR
Small grain	C&T+ CR
Close-seeded or broadcast legumes or rotation meadow	SR
Close-seeded or broadcast legumes or rotation meadow	SR
Close-seeded or broadcast legumes or rotation meadow	C
Close-seeded or broadcast legumes or rotation meadow	C
Close-seeded or broadcast legumes or rotation meadow	C&T
Close-seeded or broadcast legumes or rotation meadow	C&T

Table 14: Table continues below

Hydrologic condition *3	Curve numbers for hydrologic soil group A
	77
Poor	76
Good	74
	NA
Poor	72
Good	67
Poor	71
Good	64
Poor	70
Good	65
Poor	69
Good	64
Poor	66
Good	62
Poor	65
Good	61
	NA
Poor	65
Good	63
Poor	64
Good	60
Poor	63
Good	61
Poor	62
Good	60
Poor	61
Good	59
Poor	60
Good	58
	NA
Poor	66

Hydrologic condition *3	Curve numbers for hydrologic soil group A
Good	58
Poor	64
Good	55
Poor	63
Good	51

Table 15: Table continues below

Curve numbers for hydrologic soil group B	Curve numbers for hydrologic soil group C
86	91
85	90
83	88
NA	NA
81	88
78	85
80	87
75	82
79	84
75	82
78	83
74	81
74	80
71	78
73	79
70	77
NA	NA
76	84
75	83
75	83
72	80
74	82
73	81
73	81
72	80
72	79
70	78
71	78
69	77
NA	NA
77	85
72	81
75	83
69	78
73	80
67	76

Curve numbers for hydrologic soil group D
94

Curve numbers for hydrologic soil group D
93
90
NA
91
89
90
85
88
86
87
85
82
81
81
80
NA
88
87
86
84
85
84
84
83
82
81
81
80
NA
89
85
85
83
83
80

```
pander(cn_agricultural_notes)
```

Note Number (*)	Notes
1	Average runoff condition, and Ia=0.2S {Table 2-2b: Runoff curve numbers for cultivated agricultural lands *1}
2	Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

Note Number (*)	Notes
3	Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good 20%), and (e) degree of surface roughness.
3	Poor: Factors impair infiltration and tend to increase runoff.
3	Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c: Runoff curve numbers for other agricultural lands & notes

```
data(cn_other_agricultural)
data(cn_other_agricultural_notes)
# load the data from iemiscdata (containing Table 2-2c: Runoff curve numbers
# for other agricultural lands & notes)


pander(cn_other_agricultural)
```

Table 18: Table continues below

Cover type	Hydrologic condition
Pasture, grassland, or range–continuous forage for grazing. *2	Poor
Pasture, grassland, or range–continuous forage for grazing. *2	Fair
Pasture, grassland, or range–continuous forage for grazing. *2	Good
Meadow—continuous grass, protected from grazing and generally mowed for hay.	
Brush–brush-weed-grass mixture with brush the major element. *3	Poor
Brush–brush-weed-grass mixture with brush the major element. *3	Fair
Brush–brush-weed-grass mixture with brush the major element. *3	Good
Woods–grass combination (orchard or tree farm). *5	Poor
Woods–grass combination (orchard or tree farm). *5	Fair

Cover type	Hydrologic condition
Woods–grass combination (orchard or tree farm). *5	Good
Woods. *6	Poor
Woods. *6	Fair
Woods. *6	Good
Farmsteads–buildings, lanes, driveways, and surrounding lots.	

Table 19: Table continues below

Curve numbers for hydrologic soil group A	Notes	Curve numbers for hydrologic soil group B
68		79
49		69
39		61
NA		NA
30		58
NA		NA
48		67
35		56
30	*4	48
NA		NA
57		73
43		65
32		58
NA		NA
45		66
36		60
30	*4	55
NA		NA
59		74

Curve numbers for hydrologic soil group C	Curve numbers for hydrologic soil group D
86	89
79	84
74	80
NA	NA
71	78
NA	NA
77	83
70	77
65	73
NA	NA
82	86
76	82
72	79
NA	NA
77	83
73	79

Curve numbers for hydrologic soil group C	Curve numbers for hydrologic soil group D
70	77
NA	NA
82	86

```
pander(cn_other_agricultural_notes)
```

Note Number (*)	Notes
1	Average runoff condition, and Ia = 0.2S. {Table 2-2c: Runoff curve numbers for other agricultural lands *1}
2	Poor: <50%) ground cover or heavily grazed with no mulch.
2	Fair: 50 to 75% ground cover and not heavily grazed.
3	Poor: <50% ground cover.
3	Fair: 50 to 75% ground cover.
3	Good: >75% ground cover.
4	Actual curve number is less than 30; use CN = 30 for runoff computations.
5	CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.
6	Poor: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
6	Fair: Woods are grazed but not burned, and some forest litter covers the soil.
6	Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d: Runoff curve numbers for arid and semiarid rangelands & notes

```
data(cn_arid_semiarid)
data(cn_arid_semiarid_notes)
# load the data from iemiscdata (containing Table 2-2d: Runoff curve numbers
# for arid and semiarid rangelands & notes)


pander(cn_arid_semiarid)
```

Table 22: Table continues below

Cover type	Hydrologic condition *2
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Fair
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Good
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Fair
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Good
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Fair
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Good
Sagebrush with grass understory.	Poor
Sagebrush with grass understory.	Fair
Sagebrush with grass understory.	Good
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Fair
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Good

Table 23: Table continues below

Curve numbers for hydrologic soil group A *3	Curve numbers for hydrologic soil group B
NA	80
NA	71
NA	62
NA	NA
NA	66
NA	48
NA	30
NA	NA

Curve numbers for hydrologic soil group A *3	Curve numbers for hydrologic soil group B
NA	75
NA	58
NA	41
NA	NA
NA	67
NA	51
NA	35
NA	NA
63	77
55	72
49	68

Curve numbers for hydrologic soil group C	Curve numbers for hydrologic soil group D
87	93
81	89
74	85
NA	NA
74	79
57	63
41	48
NA	NA
85	89
73	80
61	71
NA	NA
80	85
63	70
47	55
NA	NA
85	88
81	86
79	84

```
pander(cn_arid_semiarid_notes)
```

Note Number (*)	Notes
1	Average runoff condition, and Ia, = 0.2S. For range in humid regions, use table 2-2c: Runoff curve numbers for other agricultural lands
2	Poor: <30% ground cover (litter, grass, and brush overstory).
2	Fair: 30 to 70% ground cover.
2	Good: > 70% ground cover.
3	Curve numbers for group A have been developed only for desert shrub.

Table from Appendix A: Hydrologic Soil Groups (HSGs) & notes

```
data(hsg)
data(hsg_definitions)
# load the data from iemiscdata (containing Table from Appendix A: Hydrologic
# Soil Groups (HSGs) & notes)
```

```
pander(hsg)
```

Hydrologic Soil Group (HSG)	Soil textures
A	Sand, loamy sand, or sandy loam
B	Silt loam or loam
C	Sandy clay loam
D	Clay loam, silty clay loam, sandy clay, silty clay, or clay

```
pander(hsg_notes)
```

Quitting from lines 108-118 [unnamed-chunk-6] (Tables_with_Notes.Rmd)

US EPA National Primary Drinking Water Regulations Contaminants Table & notes

```
data(USA_primary_water_contaminants)
data(USA_primary_water_contaminants_notes)
# load the data from iemiscdata (containing US EPA National Primary Drinking
# Water Regulations Contaminants Table & notes)
```

```
pander(USA_primary_water_contaminants)
```

	Contaminant MCLG1 (mg/L)2
Cryptosporidium	0
Giardia lamblia	0
Heterotrophic plate count (HPC)	NA
Legionella	0
Total Coliforms (including fecal coliform and E. Coli)	0
Quick reference guide	

Rule Summary

Turbidity	NA
Viruses (enteric)	0
Bromate	0
Chlorite	0.8
Haloacetic acids (HAA5)	n/a6

Total Trihalomethanes (TTHMs) –> n/a6

Chloramines (as Cl2)	MRDLG=41
Chlorine (as Cl2)	MRDLG=41

Chlorine dioxide (as ClO2) MRDLG=0.81

Antimony	0.006
Arsenic Quick reference	0

guide Consumer fact sheet

Asbestos (fiber > 10 micrometers)	7 million fibers per liter (MFL)
Barium	2
Beryllium	0.004
Cadmium	0.005
Chromium (total)	0.1
Copper	1.3

Cyanide (as free cyanide) 0.2

Fluoride	4.0

Lead Quick reference guide 0
Rule information

Mercury (inorganic)	0.002

Nitrate (measured as Nitrogen) 10

Nitrite (measured as Nitrogen) 1

Selenium	0.05
Thallium	0.0005
Acrylamide	0
Alachlor	0
Atrazine	0.003

Benzene	0
Benzo(a)pyrene (PAHs)	0
Carbofuran	0.04
Carbon tetrachloride	0
Chlordane	0
Chlorobenzene	0.1
2,4-D	0.07
Dalapon	0.2
1,2-Dibromo-3-chloropropane (DBCP)	0
o-Dichlorobenzene	0.6
p-Dichlorobenzene	0.075
1,2-Dichloroethane	0
1,1-Dichloroethylene	0.007
cis-1,2-Dichloroethylene	0.07
trans-1,2-Dichloroethylene	0.1
Dichloromethane	0
1,2-Dichloropropane	0
Di(2-ethylhexyl) adipate	0.4
Di(2-ethylhexyl) phthalate	0
Dinoseb	0.007
Dioxin (2,3,7,8-TCDD)	0
Diquat	0.02
Endothall	0.1
Endrin	0.002
Epichlorohydrin	0
Ethylbenzene	0.7
Ethylene dibromide	0
Glyphosate	0.7

Heptachlor	0
Heptachlor epoxide	0
Hexachlorobenzene	0
Hexachlorocyclopentadiene	0.05
Lindane	0.0002
Methoxychlor	0.04
Oxamyl (Vydate)	0.2
Polychlorinated biphenyls (PCBs)	0
Pentachlorophenol	0
Picloram	0.5
Simazine	0.004
Styrene	0.1
Tetrachloroethylene	0
Toluene	1
Toxaphene	0
2,4,5-TP (Silvex)	0.05
1,2,4-Trichlorobenzene	0.07
1,1,1-Trichloroethane	0.20
1,1,2-Trichloroethane	0.003
Trichloroethylene	0
Vinyl chloride	0
Xylenes (total)	10
Alpha particles	none ---------- 0
Beta particles and photon emitters	none ———- 0
Radium 226 and Radium 228 (combined)	none ———- 0

Uranium 0

Table 28: Table continues below

MCL or TT1 (mg/L)2	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)
TT3	Gastrointestinal illness (such as diarrhea, vomiting, and cramps)
TT3	Gastrointestinal illness (such as diarrhea, vomiting, and cramps)
TT3	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.
TT3	Legionnaire's Disease, a type of pneumonia
5.0%4	Not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present5
TT3	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness (such as whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing microorganisms such as viruses, parasites and some bacteria. These organisms can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.
TT3	Gastrointestinal illness (such as diarrhea, vomiting, and cramps)
0.010	Increased risk of cancer
1.0	Anemia; infants and young children: nervous system effects
0.060	Increased risk of cancer
========–>–> 0.080	Liver, kidney or central nervous system problems; increased risk of cancer
MRDL=4.01	Eye/nose irritation; stomach discomfort, anemia
MRDL=4.01	Eye/nose irritation; stomach discomfort
MRDL=0.81	Anemia; infants and young children: nervous system effects
0.006	Increase in blood cholesterol; decrease in blood sugar
0.010 as of 01/23/06	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer
7 MFL	Increased risk of developing benign intestinal polyps
2	Increase in blood pressure
0.004	Intestinal lesions
0.005	Kidney damage
0.1	Allergic dermatitis

MCL or TT1 (mg/L)2	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)
TT7; Action Level=1.3	Short term exposure: Gastrointestinal distress Long term exposure: Liver or kidney damage People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level
0.2	Nerve damage or thyroid problems
4.0	Bone disease (pain and tenderness of the bones); Children may get mottled teeth
TT7; Action Level=0.015	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities Adults: Kidney problems; high blood pressure
0.002	Kidney damage
10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.
1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.
0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems
0.002	Hair loss; changes in blood; kidney, intestine, or liver problems
TT8	Nervous system or blood problems; increased risk of cancer
0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer
0.003	Cardiovascular system or reproductive problems
0.005	Anemia; decrease in blood platelets; increased risk of cancer
0.0002	Reproductive difficulties; increased risk of cancer
0.04	Problems with blood, nervous system, or reproductive system
0.005	Liver problems; increased risk of cancer
0.002	Liver or nervous system problems; increased risk of cancer
0.1	Liver or kidney problems
0.07	Kidney, liver, or adrenal gland problems
0.2	Minor kidney changes
0.0002	Reproductive difficulties; increased risk of cancer
0.6	Liver, kidney, or circulatory system problems

MCL or TT1 (mg/L)2	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)
0.075	Anemia; liver, kidney or spleen damage; changes in blood
0.005	Increased risk of cancer
0.007	Liver problems
0.07	Liver problems
0.1	Liver problems
0.005	Liver problems; increased risk of cancer
0.005	Increased risk of cancer
0.4	Weight loss, liver problems, or possible reproductive difficulties.
0.006	Reproductive difficulties; liver problems; increased risk of cancer
0.007	Reproductive difficulties
0.00000003	Reproductive difficulties; increased risk of cancer
0.02	Cataracts
0.1	Stomach and intestinal problems
0.002	Liver problems
TT8	Increased cancer risk, and over a long period of time, stomach problems
0.7	Liver or kidneys problems
0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer
0.7	Kidney problems; reproductive difficulties
0.0004	Liver damage; increased risk of cancer
0.0002	Liver damage; increased risk of cancer
0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer
0.05	Kidney or stomach problems
0.0002	Liver or kidney problems
0.04	Reproductive difficulties
0.2	Slight nervous system effects
0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer
0.001	Liver or kidney problems; increased cancer risk
0.5	Liver problems
0.004	Problems with blood
0.1	Liver, kidney, or circulatory system problems
0.005	Liver problems; increased risk of cancer
1	Nervous system, kidney, or liver problems
0.003	Kidney, liver, or thyroid problems; increased risk of cancer
0.05	Liver problems
0.07	Changes in adrenal glands
0.2	Liver, nervous system, or circulatory problems
0.005	Liver, kidney, or immune system problems
0.005	Liver problems; increased risk of cancer

MCL or TT1 (mg/L)2	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)
0.002	Increased risk of cancer
10	Nervous system damage
15 picocuries per Liter (pCi/L)	Increased risk of cancer
4 millirems per year	Increased risk of cancer
5 pCi/L	Increased risk of cancer
30 ug/L as of 12/08/03	Increased risk of cancer, kidney toxicity

Table 29: Table continues below

Sources of Contaminant in Drinking Water
Human and animal fecal waste
Human and animal fecal waste
HPC measures a range of bacteria that are naturally present in the environment
Found naturally in water; multiplies in heating systems
Coliforms are naturally present in the environment; as well as feces; fecal coliforms and E. coli only come from human and animal fecal waste.
Soil runoff
Human and animal fecal waste
Byproduct of drinking water disinfection
Byproduct of drinking water disinfection
Byproduct of drinking water disinfection
Byproduct of drinking water disinfection
Water additive used to control microbes
Water additive used to control microbes
Water additive used to control microbes
Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Erosion of natural deposits; runoff from orchards, runoff from glass and electronics production wastes
Decay of asbestos cement in water mains; erosion of natural deposits
Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries
Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints
Discharge from steel and pulp mills; erosion of natural deposits
Corrosion of household plumbing systems; erosion of natural deposits

Sources of Contaminant in Drinking Water
Discharge from steel/metal factories; discharge from plastic and fertilizer factories
Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories
Corrosion of household plumbing systems; erosion of natural deposits
Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands
Runoff from fertilizer use; leaking from septic tanks, sewage; erosion of natural deposits
Runoff from fertilizer use; leaking from septic tanks, sewage; erosion of natural deposits
Discharge from petroleum refineries; erosion of natural deposits; discharge from mines
Leaching from ore-processing sites; discharge from electronics, glass, and drug factories
Added to water during sewage/wastewater treatment
Runoff from herbicide used on row crops
Runoff from herbicide used on row crops
Discharge from factories; leaching from gas storage tanks and landfills
Leaching from linings of water storage tanks and distribution lines
Leaching of soil fumigant used on rice and alfalfa
Discharge from chemical plants and other industrial activities
Residue of banned termiticide
Discharge from chemical and agricultural chemical factories
Runoff from herbicide used on row crops
Runoff from herbicide used on rights of way
Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards
Discharge from industrial chemical factories
Discharge from industrial chemical factories
Discharge from industrial chemical factories
Discharge from industrial chemical factories
Discharge from industrial chemical factories
Discharge from industrial chemical factories
Discharge from drug and chemical factories
Discharge from industrial chemical factories
Discharge from chemical factories
Discharge from rubber and chemical factories
Runoff from herbicide used on soybeans and vegetables
Emissions from waste incineration and other combustion; discharge from chemical factories
Runoff from herbicide use

Sources of Contaminant in Drinking Water
Runoff from herbicide use
Residue of banned insecticide
Discharge from industrial chemical factories; an impurity of some water treatment chemicals
Discharge from petroleum refineries
Discharge from petroleum refineries
Runoff from herbicide use
Residue of banned termiticide
Breakdown of heptachlor
Discharge from metal refineries and agricultural chemical factories
Discharge from chemical factories
Runoff/leaching from insecticide used on cattle, lumber, gardens
Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock
Runoff/leaching from insecticide used on apples, potatoes, and tomatoes
Runoff from landfills; discharge of waste chemicals
Discharge from wood preserving factories
Herbicide runoff
Herbicide runoff
Discharge from rubber and plastic factories; leaching from landfills
Discharge from factories and dry cleaners
Discharge from petroleum factories
Runoff/leaching from insecticide used on cotton and cattle
Residue of banned herbicide
Discharge from textile finishing factories
Discharge from metal degreasing sites and other factories
Discharge from industrial chemical factories
Discharge from metal degreasing sites and other factories
Leaching from PVC pipes; discharge from plastic factories
Discharge from petroleum factories; discharge from chemical factories
Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation
Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation
Erosion of natural deposits
Erosion of natural deposits

```
pander(USA_primary_water_contaminants_notes)
```

Note Number (*)	Notes
1	Definitions:
1	Maximum Contaminant Level Goal (MCLG) - The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
1	Maximum Contaminant Level (MCL) - The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
1	Maximum Residual Disinfectant Level Goal (MRDLG) - The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
1	Treatment Technique (TT) - A required process intended to reduce the level of a contaminant in drinking water.
1	Maximum Residual Disinfectant Level (MRDL) - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
2	Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million (PPM).
3	EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to
3.a	Disinfect their water, and
3.b	Filter their water, or
3.c	Meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:
3.c	Cryptosporidium: Unfiltered systems are required to include Cryptosporidium in their existing watershed control provisions
3.c	Giardia lamblia: 99.9% removal/inactivation.
3.c	Viruses: 99.99% removal/inactivation.

Note Number (*)	Notes
3.c	Legionella: No limit, but EPA believes that if Giardia and viruses are removed/inactivated, according to the treatment techniques in the Surface Water Treatment Rule, Legionella will also be controlled.
3.c	Turbidity: For systems that use conventional or direct filtration, at no time can turbidity (cloudiness of water) go higher than 1 Nephelometric Turbidity Unit (NTU), and samples for turbidity must be less than or equal to 0.3 NTUs in at least 95 percent of the samples in any month. Systems that use filtration other than the conventional or direct filtration must follow state limits, which must include turbidity at no time exceeding 5 NTUs.
3.c	Heterotrophic Plate Count (HPC): No more than 500 bacterial colonies per milliliter.
3.c	Long Term 1 Enhanced Surface Water Treatment: Surface water systems or groundwater under the direct influence (GWUDI) systems serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (such as turbidity standards, individual filter monitoring, Cryptosporidium removal requirements, updated watershed control requirements for unfiltered systems).
3.c	Long Term 2 Enhanced Surface Water Treatment Rule: This rule applies to all surface water systems or ground water systems under the direct influence of surface water. The rule targets additional Cryptosporidium treatment requirements for higher risk systems and includes provisions to reduce risks from uncovered finished water storage facilities and to ensure that the systems maintain microbial protection as they take steps to reduce the formation of disinfection byproducts.
3.c	Filter Backwash Recycling: This rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.

Note Number (*)	Notes
4	No more than 5.0% samples total coliform-positive (TC-positive) in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or E. coli if two consecutive TC-positive samples, and one is also positive for E.coli fecal coliforms, system has an acute MCL violation.
5	Fecal coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. These pathogens may pose a special health risk for infants, young children, and people with severely compromised immune systems.
6	Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:
6	Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L): chloroform (0.07 mg/L.
6	Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.02 mg/L); monochloroacetic acid (0.07mg/L). Bromoacetic acid and dibromoacetic acid are regulated with this group but have no MCLGs.
7	Lead and copper are regulated by a treatment technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L.
8	Each water system must certify, in writing, to the state (using third-party or manufacturer's certification) that when acrylamide and epichlorohydrin are used to treat water, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows:
8	Acrylamide = 0.05% dosed at 1 mg/L (or equivalent)
8	Epichlorohydrin = 0.01% dosed at 20 mg/L (or equivalent)

US EPA Secondary Drinking Water Standards Table & notes

```
data(USA_secondary_water_contaminants)
data(USA_secondary_water_contaminants_notes)
# load the data from iemiscdata (containing US EPA Secondary Drinking Water
# Standards Table & notes)
```

```
pander(USA_secondary_water_contaminants)
```

Table 31: Table continues below

Contaminant	Secondary MCL
Aluminum	0.05 to 0.2 mg/L*
Chloride	250 mg/L
Color	15 color units
Copper	1.0 mg/L
Corrosivity	Non-corrosive
Fluoride	2.0 mg/L
Foaming agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 TON (threshold odor number)
pH	6.5 - 8.5
Silver	0.1 mg/L
Sulfate	250 mg/L
Total Dissolved Solids (TDS)	500 mg/L
Zinc	5 mg/L

Noticeable Effects above the Secondary MCL
colored water
salty taste
visible tint
metallic taste; blue-green staining
metallic taste; corroded pipes/ fixtures staining
tooth discoloration
frothy, cloudy; bitter taste; odor
rusty color; sediment; metallic taste; reddish or orange staining
black to brown color; black staining; bitter metallic taste
“rotten-egg”, musty or chemical smell
low pH: bitter metallic taste; corrosion high pH: slippery feel; soda taste; deposits
skin discoloration; graying of the white part of the eye
salty taste
hardness; deposits; colored water; staining; salty taste

Noticeable Effects above the Secondary MCL
metallic taste

```
pander(USA_secondary_water_contaminants_notes)
```

Note Number (*)	Notes
1	mg/L is milligrams of substance per liter of water.

Table 3-1: Roughness coefficients (Manning's n) for sheet flow

```
data(nsheetflow)
data(nsheetflow_notes)
# load the data from iemiscdata (containing Table 3-1: Roughness coefficients
# (Manning's n) for sheet flow & notes)
```

```
pander(nsheetflow)
```

Surface description	n *1
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
	NA
Fallow (no residue)	0.05
	NA
Cultivated soils:	NA
Residue cover 20%	0.06
Residue cover >20%	0.17
	NA
Grass:	NA
Short grass prairie	0.15
Dense grasses *2	0.24
Bermudagrass	0.41
Range (natural)	0.13
	NA
Woods:*3	NA
Light underbrush	0.4
Dense underbrush	0.8

```
pander(nsheetflow_notes)
```

Note Number (*)	Notes
1	The n values are a composite of information compiled by Engman (1986).
2	Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.
3	When selecting n, consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

Greenhouse Gases – Percent Contribution to Total Greenhouse Effect (Wikipedia)

```
data(greenhouse_gases_cloudy_notes_wikipedia)
data(greenhouse_gases_cloudy_notes_wikipedia_notes)
# load the data from iemiscdata [containingGreenhouse Gases -- Percent
# Contribution to Total Greenhouse Effect & notes (Wikipedia)]
```

```
pander(greenhouse_gases_cloudy_notes_wikipedia)
```

Note Number (*)	Notes
1	K&T (1997) used 353 ppm CO2 and calculated 125 W/m2 total clear-sky greenhouse effect; relied on single atmospheric profile and cloud model. ""With Clouds"" percentages are from Schmidt (2010) interpretation of K&T (1997).
2	Schmidt (2010) used 1980 climatology with 339 ppm CO2 and 155 W/m2 total greenhouse effect; accounted for temporal and 3-D spatial distribution of absorbers.
3	Greenhouse gases not listed explictly in the table include sulfur hexafluoride, hydrofluorocarbons and perfluorocarbons.

```
pander(greenhouse_gases_cloudy_notes_wikipedia_notes)
```

Quitting from lines 179-190 [unnamed-chunk-10] (Tables_with_Notes.Rmd)

Data Sources

United States Department of Agriculture Natural Resources Conservation Service Conservation Engineering Division, "Urban Hydrology for Small Watersheds Technical Release 55 (TR-55)", June 1986, pages 2-3, 2-5 - 2-8, 3-3, 4-1 - 4-2, A-1, https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=22162.wba

United States (US) Environmental Protection Agency (EPA): "National Primary Drinking Water Regulations", https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations.

United States (US) Environmental Protection Agency (EPA): "Secondary Drinking Water Standards: Guidance for Nuisance Chemicals", https://www.epa.gov/sdwa/secondary-drinking-water-standards-guidance-nuisance-chemicals.

Wikimedia Foundation, Inc. Wikipedia, 25 August 2023, "Greenhouse gas", https://en.wikipedia.org/wiki/Greenhouse_gas.

EcoC²S Links

EcoC²S Home – https://www.ecoccs.com/
About EcoC²S – https://www.ecoccs.com/about_ecoc2s.html
Services – https://www.ecoccs.com/services.html
1 Stop Shop – https://www.ecoccs.com/other_biz.html
Products – https://www.questionuniverse.com/products.html
Media – https://www.ecoccs.com/media.html
Resources – https://www.ecoccs.com/resources.html
R Trainings and Resources provided by EcoC²S (Irucka Embry, E.I.T.) – https://www.ecoccs.com/rtraining.html

Copyright and License