APPENDIX H

Ecological Risk Assessment Information and Data

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LIST OF PHOTOGRAPHS

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ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
ASL	Above Screening Level
bgs	Below Ground Surface
BLBKG	Below background concentration
BLSRV	Below Sediment Reference Value
BRAC	Base Realignment and Closure
BSL	Below Screening Level
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	Chemical of Potential Concern
COPEC	Chemical of Potential Ecological Concern
DOE	United States Department of Energy
DOW	Department of Wildlife
EcoSSL	Ecological Soil Screening Level
EDQL	Ecological Data Quality Levels
EOLP	Erie/Ontario Lake Plain
ERA	Ecological Risk Assessment
ESL	Ecological Screening Level
ESV	Ecological Screening Value
GIS	Geographic Information System
GLI	Great Lakes Initiative
HTRW	Hazardous, Toxic, and Radioactive Waste
INRMP	Integrated Natural Resources Management Plan
ISM	Incremental Sampling Methodology
NAWQC	National Ambient Water Quality Criteria
NSL	No Screening Level
NUT	Nutrient
OAC	Ohio Administrative Code
ODNR	Ohio Department of Natural Resources
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
OMZM	Outside Mixing Zone Maximum
PBT	Persistent, Bioaccumulative, and Toxic
PCB	Polychlorinated Biphenyl
PLS	Planning Level Survey
PRG	Preliminary Remediation Goal
RVAAP	Ravenna Army Ammunition Plant
SRC	Site-related Contaminant
SRV	Sediment Reference Value
TEC	Threshold Effect Concentrations
SVOC	Semi-volatile Organic Compound

ACRONYMS AND ABBREVIATIONS (CONTINUED)

USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency

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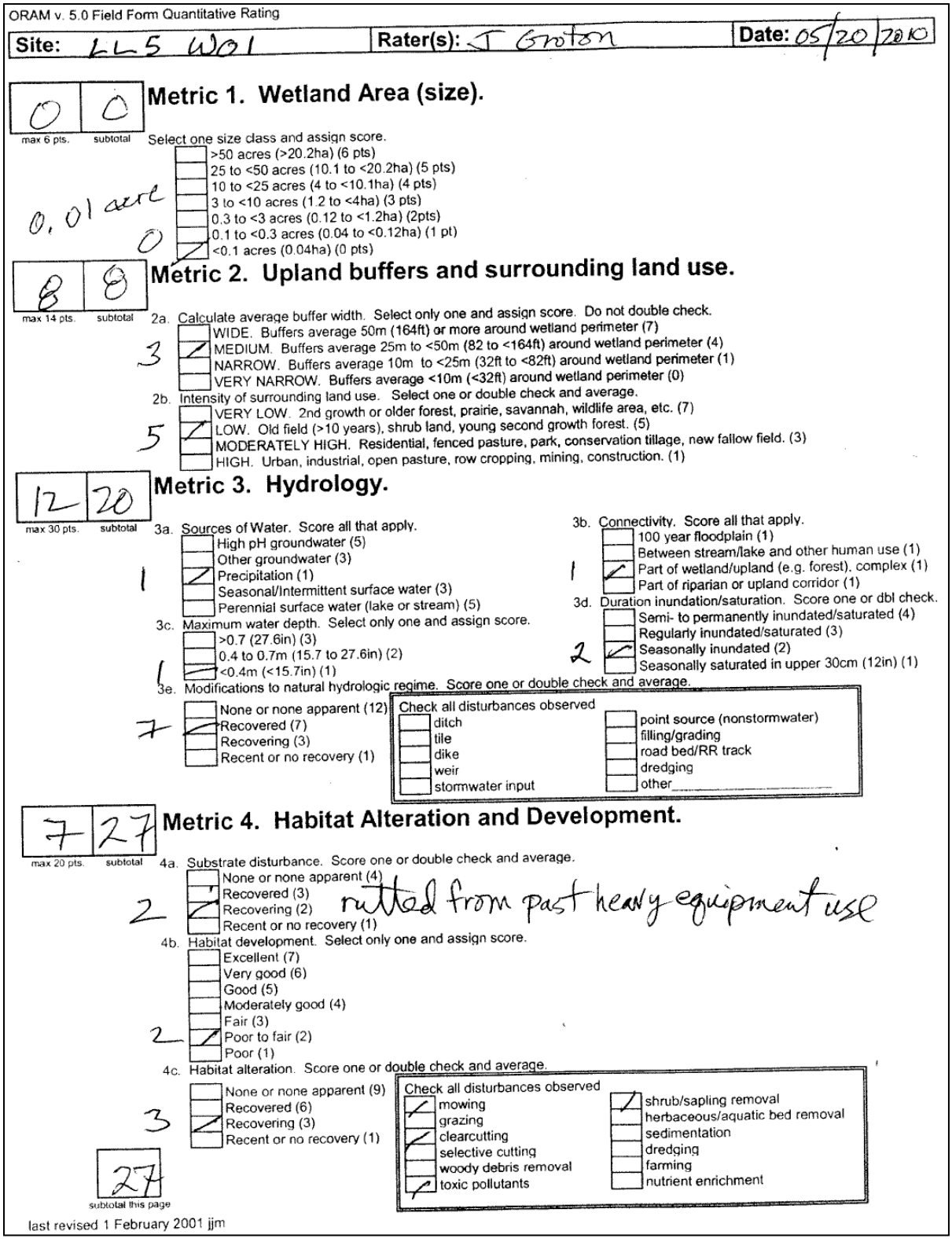
Photograph H-1. Wetland with Surrounding Forest at Load Line 5
(Photograph taken April 5, 2010)

Photograph H-2. Winter Scene at Load Line 5 with Herbaceous Vegetation in the Foreground and Forested Vegetation in the Background
(Photograph taken November 21, 2008)


ORAM v. 5.0 Field Form Quantitative Rating

Site: LL5 W01 | Rater(s): J Groton | Date: 05/20/2010

Metric 1. Wetland Area (size). (0 / 0; max 6 pts.; subtotal)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [x] <0.1 acres (0.04ha) (0 pts)

0.01 acre

0

Metric 2. Upland buffers and surrounding land use. (8 / 8; max 14 pts.; subtotal)

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- [ ] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [x] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

3

2b. Intensity of surrounding land use. Select one or double check and average.

- [ ] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [x] LOW. Old field (>10 years), shrub land, young second growth forest. (5)
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

5

Metric 3. Hydrology. (12 / 20; max 30 pts.; subtotal)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

1

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

1

3c. Maximum water depth. Select only one and assign score.

- [ ] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [x] <0.4m (<15.7in) (1)

1

3d. Duration inundation/saturation. Score one or dbl check.

- [ ] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [x] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

2

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- [ ] None or none apparent (12)
- [x] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

7

Check all disturbances observed

- [ ] ditch
- [ ] tile
- [ ] dike
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other_____

Metric 4. Habitat Alteration and Development. (7 / 27; max 20 pts.; subtotal)

4a. Substrate disturbance. Score one or double check and average.

- [ ] None or none apparent (4)
- [x] Recovered (3)
- [x] Recovering (2)
- [ ] Recent or no recovery (1)

2

rutted from past heavy equipment use

4b. Habitat development. Select only one and assign score.

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [x] Poor to fair (2)
- [ ] Poor (1)

2

4c. Habitat alteration. Score one or double check and average.

- [ ] None or none apparent (9)
- [ ] Recovered (6)
- [x] Recovering (3)
- [ ] Recent or no recovery (1)

3

Check all disturbances observed

- [x] mowing
- [ ] grazing
- [x] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [x] toxic pollutants
- [x] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient enrichment

27

subtotal this page

last revised 1 February 2001 jjm

Figure H-1. Ohio Rapid Assessment Method Worksheet for Wetland 1

ORAM v. 5.0 Field Form Quantitative Rating

Site: LL5 W01 | Rater(s): J Groton | Date: 05/20/2010

27 subtotal first page

Metric 5. Special Wetlands.

0 max 10 pts. | 27 subtotal

Check all that apply and score as indicated.

- [ ] Bog (10)
- [ ] Fen (10)
- [ ] Old growth forest (10)
- [ ] Mature forested wetland (5)
- [ ] Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- [ ] Lake Erie coastal/tributary wetland-restricted hydrology (5)
- [ ] Lake Plain Sand Prairies (Oak Openings) (10)
- [ ] Relict Wet Prairies (10)
- [ ] Known occurrence state/federal threatened or endangered species (10)
- [ ] Significant migratory songbird/water fowl habitat or usage (10)
- [ ] Category 1 Wetland. See Question 1 Qualitative Rating (-10)

Metric 6. Plant communities, interspersion, microtopography.

3.5 max 20 pts. | 30.5 subtotal

6a. Wetland Vegetation Communities.
Score all present using 0 to 3 scale.

- [ ] Aquatic bed
- [x] Emergent (1)
- [x] Shrub (1)
- [ ] Forest
- [ ] Mudflats
- [ ] Open water
- [ ] Other_____

6b. horizontal (plan view) Interspersion.
Select only one.

- [ ] High (5)
- [ ] Moderately high(4)
- [ ] Moderate (3)
- [ ] Moderately low (2)
- [x] Low (1)
- [ ] None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- [ ] Extensive >75% cover (-5)
- [ ] Moderate 25-75% cover (-3)
- [x] Sparse 5-25% cover (-1)
- [ ] Nearly absent <5% cover (0)
- [ ] Absent (1)

6d. Microtopography.
Score all present using 0 to 3 scale.

- [ ] Vegetated hummucks/tussucks
- [x] Coarse woody debris >15cm (6in)
- [ ] Standing dead >25cm (10in) dbh
- [x] Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

30.5 Category 2

End of Quantitative Rating. Complete Categorization Worksheets.

Figure H-1. Ohio Rapid Assessment Method Worksheet for Wetland 1 (continued)

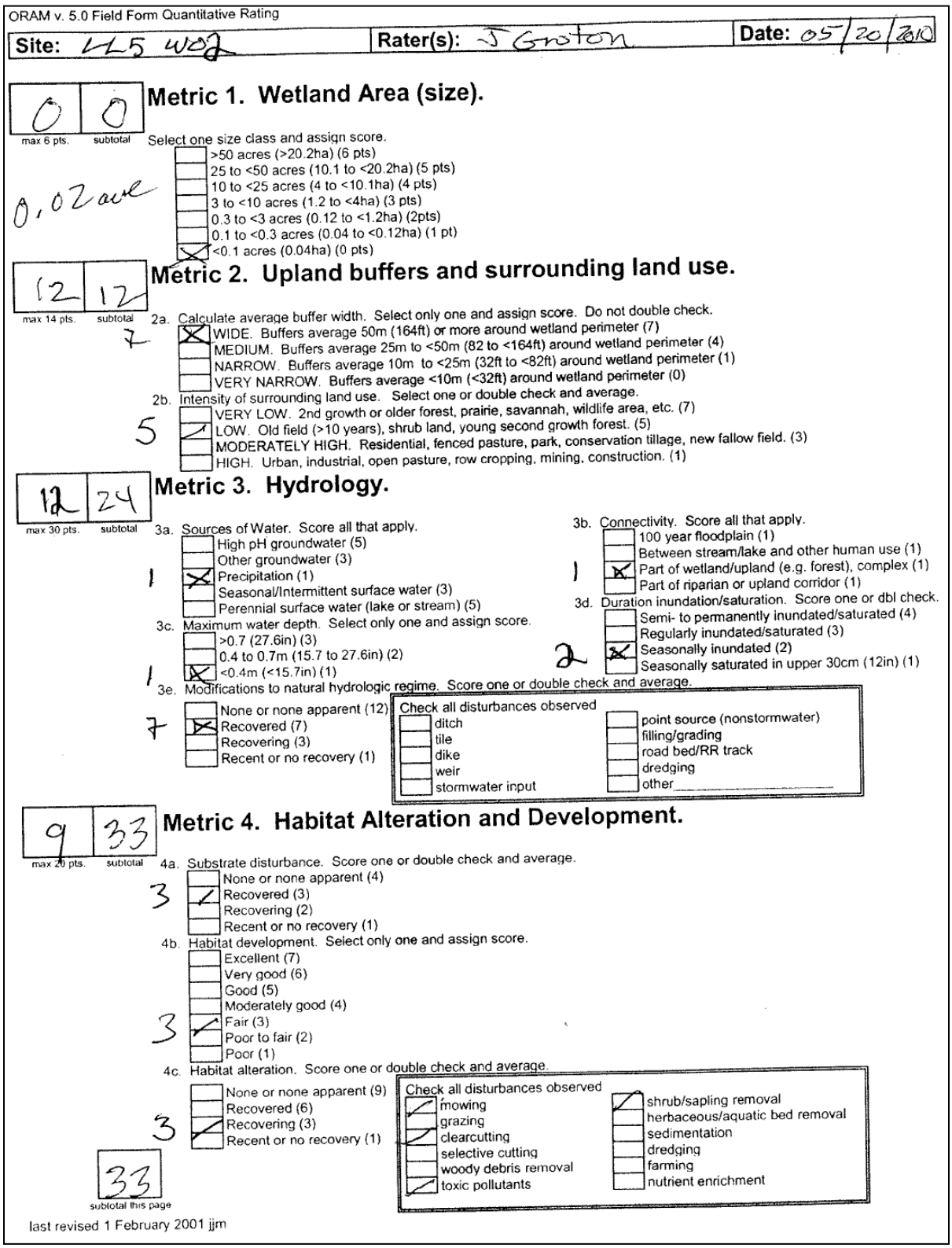
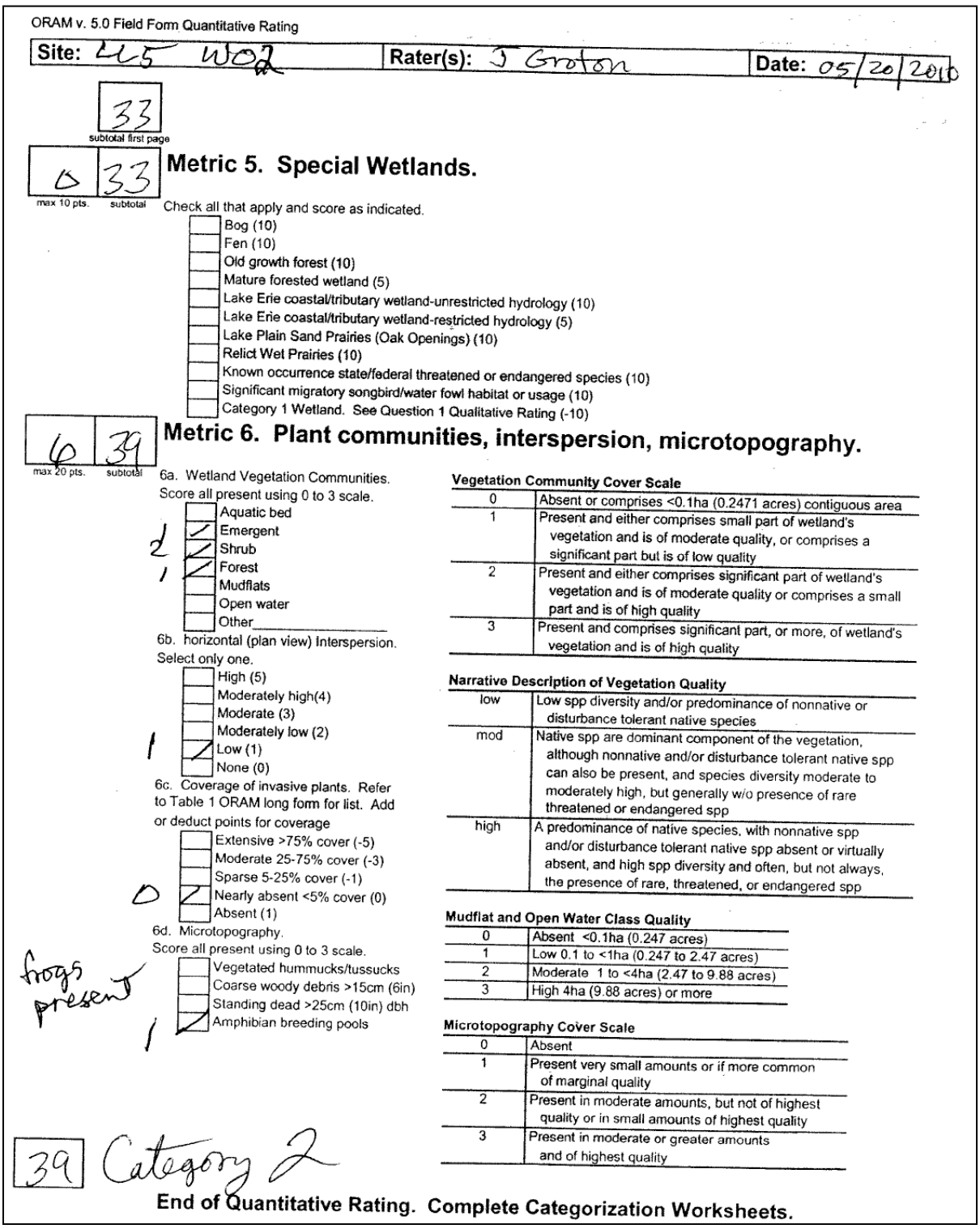


Figure H-2. Ohio Rapid Assessment Method Worksheet for Wetland 2



ORAM v. 5.0 Field Form Quantitative Rating

Site: 445 WO2 | Rater(s): J Groton | Date: 05/20/2010

33 subtotal first page

0 max 10 pts. | 33 subtotal

Metric 5. Special Wetlands.

Check all that apply and score as indicated.

- [ ] Bog (10)
- [ ] Fen (10)
- [ ] Old growth forest (10)
- [ ] Mature forested wetland (5)
- [ ] Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- [ ] Lake Erie coastal/tributary wetland-restricted hydrology (5)
- [ ] Lake Plain Sand Prairies (Oak Openings) (10)
- [ ] Relict Wet Prairies (10)
- [ ] Known occurrence state/federal threatened or endangered species (10)
- [ ] Significant migratory songbird/water fowl habitat or usage (10)
- [ ] Category 1 Wetland. See Question 1 Qualitative Rating (-10)

6 max 20 pts. | 39 subtotal

Metric 6. Plant communities, interspersion, microtopography.

6a. Wetland Vegetation Communities.
Score all present using 0 to 3 scale.

- [ ] Aquatic bed
- [x] Emergent 2
- [x] Shrub 2
- [x] Forest 1
- [ ] Mudflats
- [ ] Open water
- [ ] Other_____

6b. horizontal (plan view) Interspersion.
Select only one.

- [ ] High (5)
- [ ] Moderately high(4)
- [ ] Moderate (3)
- [ ] Moderately low (2)
- [x] Low (1) 1
- [ ] None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- [ ] Extensive >75% cover (-5)
- [ ] Moderate 25-75% cover (-3)
- [ ] Sparse 5-25% cover (-1)
- [x] Nearly absent <5% cover (0) 0
- [ ] Absent (1)

6d. Microtopography.
Score all present using 0 to 3 scale.

frogs present

- [ ] Vegetated hummucks/tussucks
- [ ] Coarse woody debris >15cm (6in)
- [ ] Standing dead >25cm (10in) dbh
- [x] Amphibian breeding pools 1

Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
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Narrative Description of Vegetation Quality

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high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

39 Category 2

End of Quantitative Rating. Complete Categorization Worksheets.

Figure H-2. Ohio Rapid Assessment Method Worksheet for Wetland 2 (continued)

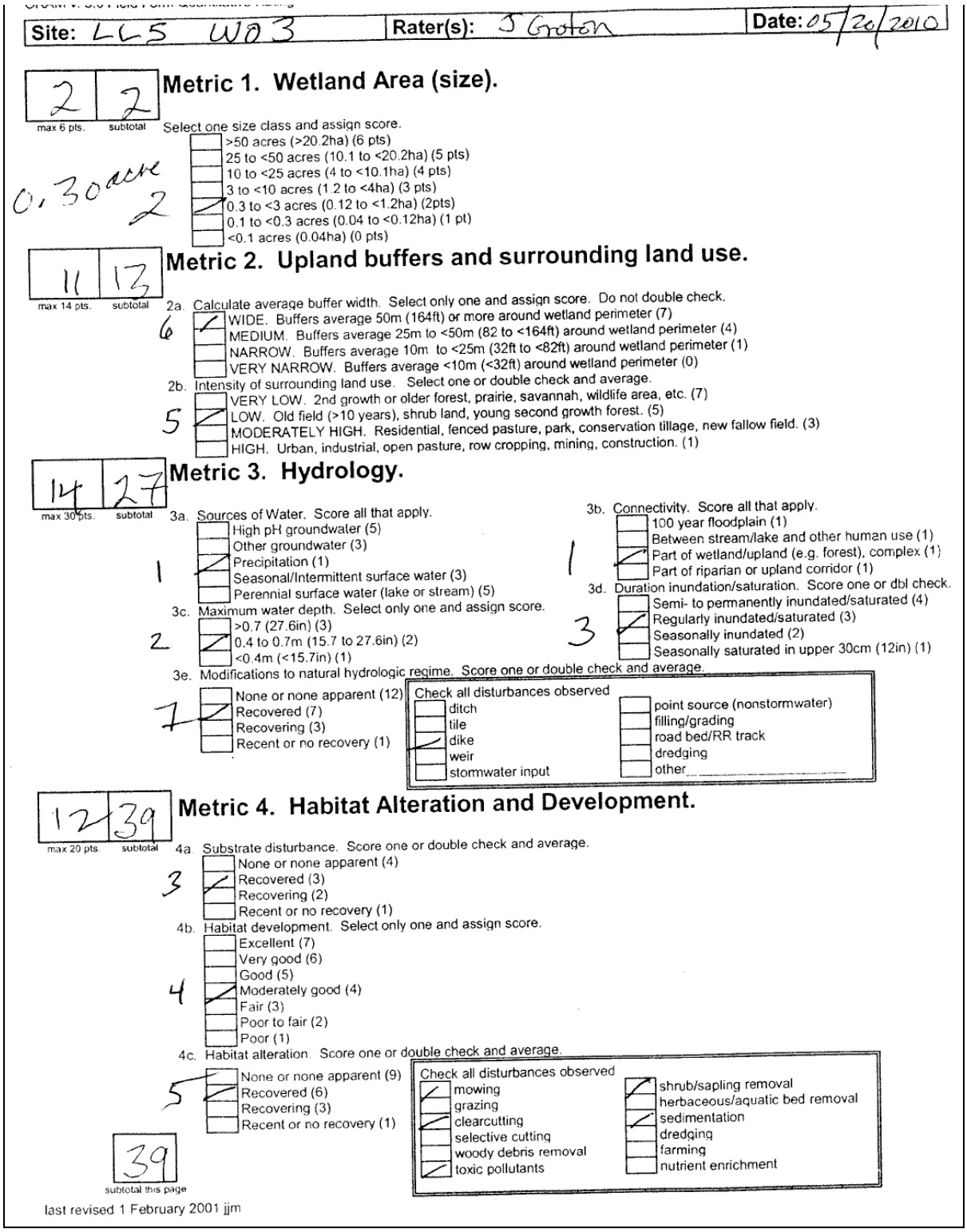

Figure H-3. Ohio Rapid Assessment Method Worksheet for Wetland 3

ORAM v. 5.0 Field Form Quantitative Rating

Site: LL5 ~~W05~~ W03 | Rater(s): J Groton | Date: 05/20/2010

39 subtotal first page

0 max 10 pts. | 39 subtotal

Metric 5. Special Wetlands.

Check all that apply and score as indicated.

- [ ] Bog (10)
- [ ] Fen (10)
- [ ] Old growth forest (10)
- [ ] Mature forested wetland (5)
- [ ] Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- [ ] Lake Erie coastal/tributary wetland-restricted hydrology (5)
- [ ] Lake Plain Sand Prairies (Oak Openings) (10)
- [ ] Relict Wet Prairies (10)
- [ ] Known occurrence state/federal threatened or endangered species (10)
- [ ] Significant migratory songbird/water fowl habitat or usage (10)
- [ ] Category 1 Wetland. See Question 1 Qualitative Rating (-10)

11 max 20 pts. | 50 subtotal

Metric 6. Plant communities, interspersion, microtopography.

6a. Wetland Vegetation Communities. Score all present using 0 to 3 scale.

5

- [ ] Aquatic bed
- [2] Emergent
- [1] Shrub
- [2] Forest
- [ ] Mudflats
- [ ] Open water
- [ ] Other_____

6b. horizontal (plan view) Interspersion. Select only one.

2

- [ ] High (5)
- [ ] Moderately high(4)
- [ ] Moderate (3)
- [✓] Moderately low (2)
- [ ] Low (1)
- [ ] None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

-1

- [ ] Extensive >75% cover (-5)
- [ ] Moderate 25-75% cover (-3)
- [X] Sparse 5-25% cover (-1)
- [0] Nearly absent <5% cover (0)
- [ ] Absent (1)

6d. Microtopography. Score all present using 0 to 3 scale.

2

- [ ] Vegetated hummucks/tussucks
- [✓] Coarse woody debris >15cm (6in)

2

- [ ] Standing dead >25cm (10in) dbh
- [✓] Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
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1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

50 Category 2

End of Quantitative Rating. Complete Categorization Worksheets.

Figure H-3. Ohio Rapid Assessment Method Worksheet for Wetland 3 (continued)

Table H-1. Historical ERA COPEC Screen for Soil at Load Line 5

Table LL5-14
Load Line 5 Ecological Risk Screening Tables for Surface Soil (0-1 ft)
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Group	Parameter	Frequency of Detection	Average Concentration	Maximum Detected Concentration	Units	Surface Soil Background Concentration	Maximum Concentration > Background	Screening Value	Maximum Concentration > Screening value	PBT	COPC	COPC Rationale
Metals	Aluminum	35 / 35	11371	18000	mg/kg	17700	Yes	600 ss2	Yes	No	Yes	ASL
	Arsenic	35 / 35	11	14	mg/kg	15.4	No	9.9 ss1	Yes	No	No	BLBKG
	Barium	35 / 35	74	220	mg/kg	88.4	Yes	283 ss1	No	No	No	BSL
	Beryllium	35 / 35	0.86	4.2	mg/kg	0.88	Yes	10 ss1	No	No	No	BSL
	Cadmium	31 / 35	0.59	3	mg/kg	0.00	Yes	4 ss1	No	No	No	BSL
	Calcium	35 / 35	13000	140000	mg/kg	15800	Yes	NUT	No	No	No	BSL
	Chromium	35 / 35	21	34	mg/kg	17.4	Yes	0.4 ss1	Yes	No	Yes	ASL
	Cobalt	35 / 35	8.2	13	mg/kg	10.4	Yes	20 ss1	No	No	No	BSL
	Copper	35 / 35	19	49	mg/kg	17.7	Yes	60 ss1	No	No	No	BSL
	Iron	35 / 35	21600	26000	mg/kg	23100	Yes	200 ss2	Yes	No	Yes	ASL
	Lead	35 / 35	41	170	mg/kg	26.1	Yes	40.5 ss1	Yes	No	Yes	ASL
	Magnesium	35 / 35	3451	16000	mg/kg	3030	Yes	NUT	No	No	No	BSL
	Manganese	35 / 35	547	3100	mg/kg	1450	Yes	100 ss2	Yes	No	Yes	ASL
	Nickel	35 / 35	20	33	mg/kg	21.1	Yes	30 ss1	Yes	No	Yes	ASL
	Potassium	35 / 35	1235	2100	mg/kg	927	Yes	NUT	No	No	No	BSL
	Selenium	30 / 35	0.73	1.8	mg/kg	1.4	Yes	0.21 ss1	Yes	No	Yes	ASL
	Sodium	35 / 35	302	970	mg/kg	123	Yes	NUT	No	No	No	BSL
	Vanadium	35 / 35	20	25	mg/kg	31.1	No	2 ss1	Yes	No	No	BLBKG
	Zinc	35 / 35	85	140	mg/kg	61.8	Yes	8.5 ss1	Yes	No	Yes	ASL
	Antimony	2 / 34	0.67	0.46	mg/kg	0.96	No	5 ss1	No	No	No	BLBKG
	Mercury	21 / 35	0.26	3	mg/kg	0.04	Yes	0.00051 ss1	Yes	Yes	Yes	ASL
	Thallium	5 / 35	0.29	0.28	mg/kg	0.00	Yes	1 ss1	No	No	No	BSL
PCBs	Aroclor 1254	1 / 3	0.024	0.038	mg/kg	--	NA	0.000332 ss4	Yes	No	Yes	ASL
SVOCs	2-Methylnaphthalene	2 / 3	0.051	0.11	mg/kg	--	NA	3.24 ss4	No	No	No	BSL
	Acenaphthene	1 / 3	0.018	0.021	mg/kg	--	NA	20 ss1	No	No	No	BSL
	Acenaphthylene	1 / 3	0.016	0.016	mg/kg	--	NA	628 ss4	No	No	No	BSL
	Anthracene	2 / 3	0.034	0.056	mg/kg	--	NA	148 ss4	No	No	No	BSL
	Benzo(a)anthracene	3 / 3	0.11	0.19	mg/kg	--	NA	5.21 ss4	No	No	No	BSL
	Benzo(a)pyrene	3 / 3	0.11	0.15	mg/kg	--	NA	1.52 ss4	No	No	No	BSL
	Benzo(b)fluoranthene	3 / 3	0.14	0.19	mg/kg	--	NA	59.8 ss4	No	No	No	BSL
	Benzo(g,h,i)perylene	3 / 3	0.071	0.097	mg/kg	--	NA	119 ss4	No	No	No	BSL
	Benzo(k)fluoranthene	3 / 3	0.078	0.11	mg/kg	--	NA	148 ss4	No	No	No	BSL
	Benzyl alcohol	2 / 3	0.70	1.3	mg/kg	--	NA	658 ss4	No	No	No	BSL
	Carbazole	2 / 3	0.045	0.038	mg/kg	--	NA	--	NSL	No	Yes	NSL
	Chrysene	3 / 3	0.14	0.22	mg/kg	--	NA	4.73 ss4	No	No	No	BSL
	Dibenzo(a,h)anthracene	2 / 3	0.020	0.024	mg/kg	--	NA	18.4 ss4	No	No	No	BSL
	Dibenzofuran	2 / 3	0.028	0.039	mg/kg	--	NA	--	NSL	No	Yes	NSL
	Fluoranthene	3 / 3	0.24	0.42	mg/kg	--	NA	122 ss4	No	No	No	BSL
	Fluorene	2 / 3	0.016	0.018	mg/kg	--	NA	122 ss4	No	No	No	BSL
	Indeno(1,2,3-cd)pyrene	3 / 3	0.062	0.09	mg/kg	--	NA	109 ss4	No	No	No	BSL
	Naphthalene	2 / 3	0.044	0.095	mg/kg	--	NA	0.0994 ss4	No	No	No	BSL
	Phenanthrene	3 / 3	0.14	0.2	mg/kg	--	NA	45.7 ss4	No	No	No	BSL
	Phenol	1 / 3	0.070	0.046	mg/kg	--	NA	30 ss1	No	No	No	BSL
	Pyrene	3 / 3	0.19	0.36	mg/kg	--	NA	78.5 ss4	No	No	No	BSL
Explosives	4-Nitrotoluene	1 / 35	0.099	0.066	mg/kg	--	NA	--	NSL	No	Yes	NSL
Other Analytes	Nitrate as N (NO3-N)	24 / 35	1.8	32	mg/kg	--	NA	--	NSL	No	Yes	NSL

Notes:
-- - no value available
mg/kg - means milligrams per Kilogram (parts per million - ppm)
ss1 - Preliminary Remediation Goals (Efroymson et al., 1997a)
ss2 - Toxiclogolgical Benchmarks for Soil and Litter Invertebrates (Efrymonson et al. 1997b)
ss3 - Toxiclogolgical Benchmarks for Terrestrial Plants (Efrymonson et al. 1997c)
ss4- Ecological Data Quality Level (USEPA Region 5, 1999)
NA - not applicable

NUT - nutrient
BLBKG - below background concentration
PBT- persistent, bioaccumulative and toxic
NSL - no screening level
ASL- above screening level
BSL - below screening level

AOC = Area of Concern
COPC = Chemical of Potential Concern
COPEC = Chemical of Potential Ecological Concern
ERA = Ecological Risk Assessment
PCB = Polychlorinated Biphenyl
SVOC = Semi-volatile Organic Compound
USEPA = United States Environmental Protection Agency

Table H-2. Checklist of Important Ecological Places and Resources at Load Line 5

Resource	Army (2005)	Ohio EPA (2008)	Load Line 5	
			Absent	Present
National Park	X	X	X	
Designated Federal Wilderness Area	X	X	X	
National Lakeshore Recreational Area	X	X	X	
Habitat known to be used by Federal designated or proposed threatened or endangered species	X	X	X	
National or State Wildlife Refuge	X	X	X	
Federal land designated for protection of natural ecosystems	X	X	X	
Habitat known to be used by state designated threatened or endangered species	X	X	X	
Federally-designated Scenic or Wild River	X	X	X	
State land designated for wildlife or game management	X	X	X	
State-designated Scenic or Wild River	X	X	X	
Wetlands and waters of the State[a]	X	X		X
National preserve	X	X[b]	X	
State-designated Natural Areas	X	X[b]	X	
Spawning areas critical for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters	X	X[c]	X	
Migratory pathways and feeding areas critical for maintenance of anadromous fish species[d]	X	X[c]	X	
Terrestrial areas used for breeding by large or dense aggregations of animals	X	X[c]	X	
Particular areas, relatively small in size, important to maintenance of unique biotic communities[e]	X	X[c]	X	
Locally important ecological place[f]	X		X	
Critical habitat for Federal designated threatened or endangered species	X		X	
Marine Sanctuary	X		X	
Areas identified under the Coastal Zone Management Act	X		X	
Sensitive Areas identified under the National Estuary Program or Near Coastal Waters Program	X		X	
Critical areas identified under the Clean Lakes Program	X		X	
National Monument	X		X	
National Seashore Recreational Area	X		X	
Unit of Coastal Barrier Resources System	X		X	
Coastal Barrier (undeveloped)	X		X	
Coastal Barrier (partially developed)	X		X	
Administratively Proposed Federal Wilderness Area	X		X	
National river reach designated as Recreational	X		X	
Habitat known to be used by species under review as to its Federal threatened or endangered status	X		X	
State-designated areas for protection or maintenance of aquatic life	X		X	
Fragile landscapes, land sensitive to degradation if vegetative habitat or cover diminishes	X		X	
State, local, or private land designated for protection of natural ecosystems		X	X	
Federal land designated for wildlife or game management		X	X	
Surface water, as that term is used in Chapter 3745-1 of the OAC		X		X

Table H-2. Checklist of Important Ecological Places and Resources at Load Line 5 (continued)

Resource	Army (2005)	Ohio EPA (2008)	Load Line 5	
			Absent	Present
Federally-listed or state-listed threatened or endangered species		X	X	
State of Ohio special interest or declining species and its associated habitat		X	X	
State Park		X	X	

U.S. Army Biological Technical Assistance Group, *Technical Document for Ecological Risk Assessment: Process for Developing Management Goals.* August 2005.

Ohio EPA. *Guidance for Conducting Ecological Risk Assessments (Ohio EPA).* Division of Emergency and Remedial Response. April 2008.

[a]For Ohio EPA 2008, as qualified by "regulated under federal law and state of Ohio's water quality laws."

[b]Ohio EPA does not restrict preserves and natural areas to national or state.

[c]Ohio EPA lists "wildlife populations and their associated important nesting areas and food resources, taking into consideration land use and the quality and extent of habitat on and in the vicinity of the site."

[d]Within river reaches or areas in lakes or coastal tidal waters in which fish spend extended periods of time.

[e]Identified by the Integrated Natural Resource Management Plan, Base Realignment and Closure Cleanup Plan or Redevelopment Plan, or other official land management plans.

[f]The Ohio Army National Guard (OHARNG 2014) has five special interest areas (important resources) at the Ravenna Army Ammunition Plant: mixed mature woods, Hemlock Ravine-Wadsworth Glen, mixed swamp forest, mixed valuable communities, and oak/maple swamp forest. Also, the OHARNG recognizes the importance of federal and state-listed threatened and endangered plant and animal species.

X = Designated as important OAC = Ohio Administrative Code

Ohio EPA = Ohio Environmental Protection Agency

Table H-3. Natural Resources Management Goals (OHARNG 2014)

Goals and Objectives of Ohio Army National Guard	Comments on Goals Relative to HTRW Work at RVAAP
Goal 1. Manage natural resources in a manner that is compatible with and supports the military mission while complying with applicable Federal and State laws and Army regulations and policies. Objective 1.1: Initiate programs and projects that enhance the training land and training opportunities and/or do not unnecessarily limit training land availability. Objective 1.2: Continue to educate Camp Ravenna users regarding the natural resources at the Camp Ravenna and their part in ensuring sustainable use of the site in perpetuity.	U.S. Army committed to natural resources management in a manner that is compatible with and supports the military mission and complies with Federal and State laws and Army regulations and policies.
Goal 2. Maintain and foster positive working relationships with the U.S. Fish and Wildlife Service, the ODNR DOW, and other federal, state and local natural resources management agencies and organizations for the benefit of the military mission, the natural resources being managed, and the citizens of Ohio and the nation. Objective 2.1: Effectively communicate mission needs to cooperating agencies and solicit input/review on projects with the potential to impact natural resources, especially in areas of regulatory primacy. Objective 2.2: Provide copies of biological surveys to interested cooperating agencies. Objective 2.3: Facilitate cooperative management programs and projects that are compatible with the military mission and within the capabilities of the Camp Ravenna staff.	The U.S. Army works and coordinates with other federal and state agencies as necessary if mission or projects have the potential to impact natural resources.
Goal 3. Monitor the condition of the natural resources and the implied impacts from training and the natural resources management program on the natural resources at the Camp Ravenna. Objective 3.1: Maintain current species inventories and other PLSs through periodic reoccurring surveys and inventories.	The U.S. Army conducts natural resource management activities at the facility to monitor potential impacts from training or other disturbance activities.
Goal 4. Protect and maintain populations of rare plant and animal species on the Camp Ravenna in compliance with Federal and State laws and regulations. Objective 4.1: Avoid negative impacts to federally listed species and avoid/minimize impacts to State listed and otherwise rare species.	The U.S. Army protects and maintains populations of rare plant and animal species by implementing a natural resource management plan at the facility and by avoiding and/or not disturbing areas with rare species.

Table H-3. Natural Resources Management Goals (OHARNG 2014) (continued)

Goals and Objectives of Ohio Army National Guard	Comments on Goals Relative to HTRW Work at RVAAP
Goal 5. Sustain usable training lands and native natural resources by managing non-native and invasive species, vegetation and plant communities, and nuisance wildlife species. Objective 5.1: Manage populations of invasive plant species where they hinder training and/or habitat management objectives. Objective 5.2: Manage non-native and invasive insect species that pose a threat to forest resources. Objective 5.3: Manage terrestrial vegetation to support training, encourage native plant communities, and prevent damage to training site facilities and infrastructure. Objective 5.4: Manage the beaver population to prevent damage to training site facilities and infrastructure and to maintain the quality warm water habitats of Hinkley Creek, Sand Creek, and South Fork Eagle Creek. Objective 5.5: Manage other nuisance animals that negatively impact the ecosystem.	The U.S. Army sustains usable training lands and native natural resources by implementing a natural resource management plan which incorporates invasive species and nuisance species management and by utilizing native species mixes for re-vegetation after ground disturbance activities.
Goal 6. Manage wildlife resources in a manner compatible with the military mission and within the limits of the natural habitat. Objective 6.1: Cooperatively manage wildlife resources with the Ohio DOW. Objective 6.2: Provide opportunity for wildlife recreation to the public that is compatible with the military mission. Objective 6.3: Maintain wildlife population without augmenting the habitat with artificial food plots.	The U.S. Army minimizes habitat disturbance during HTRW activities and utilizes sustainability practices when disturbance is required in order to properly manage and maintain wildlife populations and resources.

Table H-3. Natural Resources Management Goals (OHARNG 2014) (continued)

Goals and Objectives of Ohio Army National Guard	Comments on Goals Relative to HTRW Work at RVAAP
Goal 7. Manage the Camp Ravenna whitetail deer population in a manner that minimizes impacts on the military mission, is ecologically sustainable, provides for public hunting, and is in accordance with Army regulations and state law. Objective 7.1: Census the deer herd. Objective 7.2: Determine winter carrying capacity for whitetail deer at Camp Ravenna. Objective 7.3: Maintain the white-tailed deer population at or near carrying capacity and at a buck-to-doe ratio close to 1:2 (acceptable ratio is dependent on population size) with a maximum of six hunter's dates per year.	The U.S. Army manages populations of white-tailed deer by implementing a natural resource management plan at the facility in a manner that is compatible with and supports the military mission and complies with state laws and Army regulations and policies.
Goal 8. Manage forest resources to the benefit of the military mission, to perpetuate the ecosystem functions, to support regional ecosystem needs, and for the production of forest products. Objective 8.1: Maintain current forest resource data. Objective 8.2: Implement forest management strategies identified in the Camp Ravenna INRMP.	The U.S. Army sustains and manages forest resources by implementing a natural resource management plan. During HTRW activities, efforts are made by the Army to minimize impacts to forest communities.
Goal 9. Manage wetlands and other surface waters in accordance with applicable Federal, State, and local regulations and to protect water quality and ecological functions while facilitating the military mission. Objective 9.1: Avoid wetland fills. Objective9.2: Minimize and mitigate unavoidable wetland fills. Objective 9.3: Maintain healthy aquatic ecosystems in ponds. Objective 9.4: Restore, enhance and create wetlands when possible and compatible with the military mission.	Wetlands and other surface waters are to be protected during disturbance activities in accordance with federal, state, and local regulations. Avoidance measures will be implemented as practical. Some AOCs have wetlands.
Goal 10. Manage soil to maintain productivity and prevent and repair erosion in accordance with State and Federal laws and regulations so that the Camp Ravenna can support doctrinally required military training in perpetuity. Objective 10.1: Conduct training and other activities in locations with soil most suitable for supporting the activity. Objective 10.2: Rehabilitate, repair, and maintain areas damaged by training and other activities.	Management of soil relevant to remedial activities under CERCLA. Appropriate storm water and erosion controls are to be utilized during activities that require ground disturbance.

Table H-3. Natural Resources Management Goals (OHARNG 2014) (continued)

Goals and Objectives of Ohio Army National Guard	Comments on Goals Relative to HTRW Work at RVAAP
Goal 11. Manage cultural resources on the Camp Ravenna in accordance with State and Federal laws and regulations while implementing the natural resources management program. Objective 11.1: Comply with Federal, State, and local laws and regulations pertaining to cultural resources found on the training site.	The U.S. Army utilizes a cultural resource management plan to manage and protect cultural resources at the facility. Coordination with state and federal agencies regarding cultural resources is conducted as necessary. Restoration contractors are also advised to utilize the Camp Ravenna Policy for Inadvertent Discoveries for reporting purposes should they come upon a cultural item.
Goal 12. Develop, maintain, and manage data regarding natural resources at the Camp Ravenna through the use of GIS for efficient data storage, retrieval, analysis, and presentation. Objective 12.1: Develop accurate and usable natural resources GIS data.	Natural resource data is collected and managed by the OHARNG. This data may be utilized during restoration activities in order to provide an accurate portrait of natural resources at an AOC.

OHARNG. *Integrated Natural Resources Management Plan and Environmental Assessment for the Ravenna Training and Logistics Site, Portage and Trumbull Counties, Ohio.* December 2014.

AOC = Area of Concern
Camp Ravenna = Camp Ravenna Joint Military Training Center
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
DOW = Department of Wildlife
GIS = Geographic Information System
HTRW = Hazardous, Toxic, and Radioactive Waste
INRMP = Integrated Natural Resources Management Plan
ODNR = Ohio Department of Natural Resources
OHARNG = Ohio Army National Guard
Ohio EPA = Ohio Environmental Protection Agency
PLS = Planning Level Survey (Wetland)
RVAAP = Ravenna Army Ammunition Plant

Table H-4. Sediment Reference Values for RVAAP

Chemical	SRV (mg/kg)
Aluminum	2.90E+04
Antimony	1.30E+00
Arsenic	2.50E+01
Barium	1.90E+02
Beryllium	8.00E-01
Cadmium	7.90E-01
Calcium	2.10E+04
Chromium	2.90E+01
Cobalt	1.20E+01
Copper	3.20E+01
Iron	4.10E+04
Lead	4.70E+01
Magnesium	7.10E+03
Manganese	1.50E+03
Mercury	1.20E-01
Nickel	3.30E+01
Potassium	6.80E+03
Selenium	1.70E+00
Silver	4.30E-01
Strontium	6.20E+01
Thallium	4.70E+00
Vanadium	4.00E+01
Zinc	1.60E+02

Values are EOLP (Erie/Ontario Lake Plain) or statewide from Table 2 of Appendix H, Ohio Environmental Protection Agency 2008 *Guidance for Conducting Ecological Risk Assessments*, April 2008.
RVAAP = Ravenna Army Ammunition Plant
SRV = Sediment Reference Value

Table H-5. Ecological Screening Values for Chemical Analytes in Soil

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a]		USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
Inorganic Chemicals									
Aluminum	7429-90-5	--*	Al EcoSSL	50	PRGs[b]	--	--	50	PRGs
Antimony	7440-36-0	0.27	mammalian EcoSSL for Sb	5	PRGs	0.142	USEPA Reg 5	2.70E-01	mammalian EcoSSL for Sb
Arsenic	7440-38-2	18	plant EcoSSL for As	9.9	PRGs	5.7	USEPA Reg 5	1.80E+01	plant EcoSSL for As
Barium	7440-39-3	330	soil invert EcoSSL for Ba	283	PRGs	1.04	USEPA Reg 5	3.30E+02	soil invert EcoSSL for Ba
Beryllium	7440-41-7	21	mammalian EcoSSL for Be	10	PRGs	1.06	USEPA Reg 5	2.10E+01	mammalian EcoSSL for Be
Bismuth	7440-69-9	--	--	--	--	--	--	No ESV	No Source
Boron	7440-42-8	--	--	0.5	PRGs	--	--	5.00E-01	PRGs
Bromine	7726-95-6	--	--	10	PRGs	--	--	1.00E+01	PRGs
Cadmium	7440-43-9	0.36	mammalian EcoSSL for Cd	4	PRGs	0.00222	USEPA Reg 5	3.60E-01	mammalian EcoSSL for Cd
Calcium	7440-70-2	--	--	--	--	--	--	No ESV	No Source
Chromium	16065-83-1	26	avian EcoSSL for Cr III	0.4	PRGs	0.4	ESL for Cr+3	2.60E+01	avian EcoSSL for Cr III
Chromium, hexavalent	18540-29-9	130	mammalian EcoSSL for Cr VI	--	--	--	--	1.30E+02	mammalian EcoSSL for Cr VI

Table H-5. Ecological Screening Values for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a]		USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
Cobalt	7440-48-4	13	plant EcoSSL for Co	20	PRGs	0.14	USEPA Reg 5	1.30E+01	plant EcoSSL for Co
Copper	7440-50-8	28	avian EcoSSL for Cu	60	PRGs	5.4	USEPA Reg 5	2.80E+01	avian EcoSSL for Cu
Cyanide	57-12-5	--	--	--	--	1.33	USEPA Reg 5	1.33E+00	USEPA Reg 5
Fluorine	7782-41-4	--	--	200	PRGs	--	--	2.00E+02	PRGs
Iodine	7553-56-2	--	--	4	PRGs	--	--	4.00E+00	PRGs
Iron	7439-89-6	--**	Fe EcoSSL	--	--	--	--	No ESV	No Source
Lanthanum	7439-91-0	--	--	--	--	--	--	No ESV	No Source
Lead	7439-92-1	11	avian EcoSSL for Pb	40.5	PRGs	0.0537	USEPA Reg 5	1.10E+01	avian EcoSSL for Pb
Lithium	7439-93-2	--	--	2	PRGs	--	--	2.00E+00	PRGs
Magnesium	7439-95-4	--	--	--	--	--	--	No ESV	No Source
Manganese	7439-96-5	220	plant EcoSSL for Mn	500	PRGs[b]	--	--	2.20E+02	plant EcoSSL for Mn
Mercury	7439-97-6	--	--	0.00051	PRGs	0.1	USEPA Reg 5	5.10E-04	PRGs
Mercury, methyl	22967-92-6	--	--	--	--	0.00158	USEPA Reg 5	1.58E-03	USEPA Reg 5
Molybdenum	7439-98-7	--	--	2	PRGs	--	--	2.00E+00	PRGs
Nickel	7440-02-0	38	plant EcoSSL for Ni	30	PRGs	13.6	USEPA Reg 5	3.80E+01	plant EcoSSL for Ni
Potassium	7440-09-7	--	--	--	--	--	--	No ESV	No Source
Selenium	7782-49-2	0.52	plant EcoSSL for Se	0.21	PRGs	0.0276	USEPA Reg 5	5.20E-01	plant EcoSSL for Se
Silver	7440-22-4	4.2	avian EcoSSL for Ag	2	PRGs	4.04	USEPA Reg 5	4.20E+00	avian EcoSSL for Ag
Sodium	7440-23-5	--	--	--	--	--	--	No ESV	No Source
Technetium	7440-26-8	--	--	0.2	PRGs	--	--	2.00E-01	PRGs
Tellurium	13494-80-9	--	--	--	--	--	--	No ESV	No Source
Thallium	7440-28-0	--	--	1	PRGs	0.0569	USEPA Reg 5	1.00E+00	PRGs
Tin	7440-31-5	--	--	50	PRGs	7.62	USEPA Reg 5	5.00E+01	PRGs
Titanium	7440-32-6	--	--	--	--	--	--	No ESV	No Source
Tungsten	7440-33-7	--	--	--	--	--	--	No ESV	No Source
Uranium	7440-61-1	--	--	5	PRGs	--	--	5.00E+00	PRGs
Vanadium	7440-62-2	7.8	avian EcoSSL for V	2	PRGs	1.59	USEPA Reg 5	7.80E+00	avian EcoSSL for V

Table H-5. Ecological Screening Values for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a]		USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
Zinc	7440-66-6	46	avian EcoSSL for Zn	8.5	PRGs	6.62	USEPA Reg 5	4.60E+01	avian EcoSSL for Zn
Anions									
Nitrate	14797-55-8	--	--	--	--	--	--	No ESV	No Source
Sulfide	18496-25-8	--	--	--	--	0.00358	USEPA Reg 5	3.58E-03	USEPA Reg 5
Organic Chemicals									
Acenaphthene	83-32-9	--	--	20	PRGs	682	USEPA Reg 5	2.00E+01	PRGs
Acenaphthylene	208-96-8	--	--	--	--	682	USEPA Reg 5	6.82E+02	USEPA Reg 5
Acetone	67-64-1	--	--	--	--	2.5	USEPA Reg 5	2.50E+00	USEPA Reg 5
Acetonitrile	75-05-8	--	--	--	--	1.37	USEPA Reg 5	1.37E+00	USEPA Reg 5
Acetophenone	98-86-2	--	--	--	--	300	USEPA Reg 5	3.00E+02	USEPA Reg 5
Acetylaminofluorene[2-]	53-96-3	--	--	--	--	0.596	USEPA Reg 5	5.96E-01	USEPA Reg 5
Acrolein	107-02-8	--	--	--	--	5.27	USEPA Reg 5	5.27E+00	USEPA Reg 5
Acrylonitrile	107-13-1	--	--	--	--	0.0239	USEPA Reg 5	2.39E-02	USEPA Reg 5
Aldrin	309-00-2	--	--	--	--	0.00332	USEPA Reg 5	3.32E-03	USEPA Reg 5
2-Amino-4,6-dinitrotoluene	35572-78-2	--	--	--	--	--	--	No ESV	No Source
4-Amino-2,6-dinitrotoluene	19406-51-0	--	--	--	--	--	--	No ESV	No Source
4-Aminobiphenyl	92-67-1	--	--	--	--	0.00305	USEPA Reg 5	3.05E-03	USEPA Reg 5
Aniline	62-53-3	--	--	--	--	0.0568	USEPA Reg 5	5.68E-02	USEPA Reg 5
Anthracene	120-12-7	--	--	--	--	1480	USEPA Reg 5	1.48E+03	USEPA Reg 5
Aramite	140-57-8	--	--	--	--	166	USEPA Reg 5	1.66E+02	USEPA Reg 5
Azobenzene [p-(dimethylamino)]	60-11-7	--	--	--	--	0.04	USEPA Reg 5	4.00E-02	USEPA Reg 5
PCB-1016	12674-11-2	--	--	--	--	--	--	No ESV	No Source
Arochlor-1221	11104-28-2	--	--	--	--	--	--	No ESV	No Source
Arochlor-1232	11141-16-5	--	--	--	--	--	--	No ESV	No Source
Arochlor-1242	53469-21-9	--	--	--	--	--	--	No ESV	No Source
Arochlor-1248	12672-29-6	--	--	--	--	--	--	No ESV	No Source

Table H-5. Ecological Screening Values for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a]		USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
PCB-1254	11097-69-1	--	--	--	--	--	--	No ESV	No Source
PCB-1260	11096-82-5	--	--	--	--	--	--	No ESV	No Source
Benzene	71-43-2	--	--	--	--	0.255	USEPA Reg 5	2.55E-01	USEPA Reg 5
Benzenemethanol	100-51-6	--	--	--	--	65.8	USEPA Reg 5	6.58E+01	USEPA Reg 5
Benz(a)anthracene	56-55-3	--	--	--	--	5.21	USEPA Reg 5	5.21E+00	USEPA Reg 5
Benzo(a)pyrene	50-32-8	--	--	--	--	1.52	USEPA Reg 5	1.52E+00	USEPA Reg 5
Benzo(b)fluoranthene	205-99-2	--	--	--	--	59.8	USEPA Reg 5	5.98E+01	USEPA Reg 5
Benzo(ghi)perylene	191-24-2	--	--	--	--	119	USEPA Reg 5	1.19E+02	USEPA Reg 5
Benzo(k)fluoranthene	207-08-9	--	--	--	--	148	USEPA Reg 5	1.48E+02	USEPA Reg 5
BHC	608-73-1	--	--	--	--	--	--	No ESV	No Source
BHC, alpha	319-84-6	--	--	--	--	0.0994	USEPA Reg 5	9.94E-02	USEPA Reg 5
BHC, beta	319-85-7	--	--	--	--	0.00398	USEPA Reg 5	3.98E-03	USEPA Reg 5
BHC, delta	319-86-8	--	--	--	--	9.94	USEPA Reg 5	9.94E+00	USEPA Reg 5
BHC, gamma (Lindane)	58-89-9	--	--	--	--	0.005	USEPA Reg 5	5.00E-03	USEPA Reg 5
Biphenyl	92-52-4	--	--	60	PRGs	--	--	6.00E+01	PRGs
bis(2-chloroethoxy) methane	111-91-1	--	--	--	--	0.302	USEPA Reg 5	3.02E-01	USEPA Reg 5
bis(2-Chloroethyl) ether	111-44-4	--	--	--	--	23.7	USEPA Reg 5	2.37E+01	USEPA Reg 5
bis(2-Ethylhexyl)phthalate	117-81-7	--	--	--	--	0.925	USEPA Reg 5	9.25E-01	USEPA Reg 5
4-Bromoaniline	106-40-1	--	--	--	--	--	--	No ESV	No Source
Bromodichloromethane	75-27-4	--	--	--	--	0.54	USEPA Reg 5	5.40E-01	USEPA Reg 5
Bromoform	75-25-2	--	--	--	--	15.9	USEPA Reg 5	1.59E+01	USEPA Reg 5
Bromomethane	74-83-9	--	--	--	--	0.235	USEPA Reg 5	2.35E-01	USEPA Reg 5
4-bromophenyl-phenylether	101-55-3	--	--	--	--	--	--	No ESV	No Source
2-Butanone	78-93-3	--	--	--	--	89.6	USEPA Reg 5	8.96E+01	USEPA Reg 5
Butylbenzyl phthalate	85-68-7	--	--	--	--	0.239	USEPA Reg 5	2.39E-01	USEPA Reg 5
N-Nitrosodi-n-Butylamine	924-16-3	--	--	--	--	0.267	USEPA Reg 5	2.67E-01	USEPA Reg 5
Carbazole	86-74-8	--	--	--	--	--	--	No ESV	No Source

Table H-5. Ecological Screening Values for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a]		USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
Carbon disulfide	75-15-0	--	--	--	--	0.0941	USEPA Reg 5	9.41E-02	USEPA Reg 5
Carbon tetrachloride	56-23-5	--	--	--	--	2.98	USEPA Reg 5	2.98E+00	USEPA Reg 5
Chlordane	12789-03-6	--	--	--	--	0.224	USEPA Reg 5	2.24E-01	USEPA Reg 5
alpha-Chlordane	12789-03-6	--	--	--	--	0.224	USEPA Reg 5	2.24E-01	USEPA Reg 5
gamma-Chlordane	12789-03-6	--	--	--	--	0.224	USEPA Reg 5	2.24E-01	USEPA Reg 5
Chloroacetamide	79-07-2	--	--	2	PRGs[c]	--	--	2.00E+00	PRGs
3-Chloroaniline	108-42-9	--	--	20	PRGs	--	--	2.00E+01	PRGs
4-Chloroaniline	106-47-8	--	--	--	--	1.1	USEPA Reg 5	1.10E+00	USEPA Reg 5
Chlorobenzene	108-90-7	--	--	40	PRGs	13.1	USEPA Reg 5	4.00E+01	PRGs
Chlorobenzilate	510-15-6	--	--	--	--	5.05	USEPA Reg 5	5.05E+00	USEPA Reg 5
Chloroethane	75-00-3	--	--	--	--	--	--	No ESV	No Source
Chloroform	67-66-3	--	--	--	--	1.19	USEPA Reg 5	1.19E+00	USEPA Reg 5
Chloromethane	74-87-3	--	--	--	--	10.4	USEPA Reg 5	1.04E+01	USEPA Reg 5
2-Chloronaphthalene	91-58-7	--	--	--	--	0.0122	USEPA Reg 5	1.22E-02	USEPA Reg 5
2-Chlorophenol	95-57-8	--	--	--	--	0.243	USEPA Reg 5	2.43E-01	USEPA Reg 5
3-Chlorophenol	108-43-0	--	--	7	PRGs	--	--	7.00E+00	PRGs
4-Chlorophenol	106-48-9	--	--	--	--	--	--	No ESV	No Source
4-Chlorophenyl-phenyl ether	7005-72-3	--	--	--	--	--	--	No ESV	No Source
4-chloro-3-methylphenol	59-50-7	--	--	--	--	7.95	USEPA Reg 5	7.95E+00	USEPA Reg 5
Chloropropene	107-05-1	--	--	--	--	0.0134	USEPA Reg 5	1.34E-02	USEPA Reg 5
Chloroprene	126-99-8	--	--	--	--	0.0029	USEPA Reg 5	2.90E-03	USEPA Reg 5
Chrysene	218-01-9	--	--	--	--	4.73	USEPA Reg 5	4.73E+00	USEPA Reg 5
m-Cresol	108-39-4	--	--	--	--	3.49	USEPA Reg 5	3.49E+00	USEPA Reg 5
2,4-D	94-75-7	--	--	--	--	0.0272	USEPA Reg 5	2.72E-02	USEPA Reg 5
4,4'-DDD	72-54-8	0.021	mammalian EcoSSL for DDT and metabolites	--	--	0.758	USEPA Reg 5	2.10E-02	mammalian EcoSSL for DDT and metabolites

Table H-5. Ecological Screening Values for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a]		USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
4,4'-DDE	72-55-9	0.021	mammalian EcoSSL for DDT and metabolites	--	--	0.596	USEPA Reg 5	2.10E-02	mammalian EcoSSL for DDT and metabolites
4,4'-DDT	50-29-3	0.021	mammalian EcoSSL for DDT and metabolites	--	--	0.0035	USEPA Reg 5	2.10E-02	mammalian EcoSSL for DDT and metabolites
Diallate	2303-16-4	--	--	--	--	0.452	USEPA Reg 5	4.52E-01	USEPA Reg 5
Diazinon	333-41-5	--	--	--	--	--	--	No ESV	No Source
Dibenz(a,h)anthracene	53-70-3	--	--	--	--	18.4	USEPA Reg 5	1.84E+01	USEPA Reg 5
Dibenzofuran	132-64-9	--	--	--	--	--	--	No ESV	No Source
1,2-Dibromo-3-Chloropropane	96-12-8	--	--	--	--	0.0352	USEPA Reg 5	3.52E-02	USEPA Reg 5
Dibromochloromethane	124-48-1	--	--	--	--	2.05	USEPA Reg 5	2.05E+00	USEPA Reg 5
Dibromoethane	106-93-4	--	--	--	--	1.23	USEPA Reg 5	1.23E+00	USEPA Reg 5
2,4-Dichloroaniline	554-00-7	--	--	100	PRGs[c]	--	--	1.00E+02	PRGs
3,4-Dichloroaniline	95-76-1	--	--	20	PRGs[c]	--	--	2.00E+01	PRGs
1,2-Dichlorobenzene	95-50-1	--	--	--	--	2.96	USEPA Reg 5	2.96E+00	USEPA Reg 5
1,3-Dichlorobenzene	541-73-1	--	--	--	--	37.7	USEPA Reg 5	3.77E+01	USEPA Reg 5
1,4-Dichlorobenzene	106-46-7	--	--	20	PRGs	0.546	USEPA Reg 5	2.00E+01	PRGs
3,3'-Dichlorobenzidine	91-94-1	--	--	--	--	0.646	USEPA Reg 5	6.46E-01	USEPA Reg 5
Cis-1,4-dichloro-2-butene	1476-11-5	--	--	--	--	--	--	No ESV	No Source
Trans-1,4-dichloro-2-butene	110-57-6	--	--	--	--	--	--	No ESV	No Source
Dichlorodifluromethane	75-71-8	--	--	--	--	39.5	USEPA Reg 5	3.95E+01	USEPA Reg 5
1,1-Dichloroethane	75-34-3	--	--	--	--	20.1	USEPA Reg 5	2.01E+01	USEPA Reg 5
1,2-Dichloroethane	107-06-2	--	--	--	--	21.2	USEPA Reg 5	2.12E+01	USEPA Reg 5
1,1-Dichloroethene	75-35-4	--	--	--	--	8.28	USEPA Reg 5	8.28E+00	USEPA Reg 5
1,2-Dichloroethene	540-59-0	--	--	--	--	0.784	USEPA Reg 5 (for trans form)	7.84E-01	USEPA Reg 5 (for trans form)

Table H-5. Ecological Screening Values for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a]		USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
2,4-Dichlorophenol	120-83-2	--	--	--	--	87.5	USEPA Reg 5	8.75E+01	USEPA Reg 5
2,6-Dichlorophenol	87-65-0	--	--	--	--	1.17	USEPA Reg 5	1.17E+00	USEPA Reg 5
3,4-Dichlorophenol	95-77-2	--	--	20	PRGs	--	--	2.00E+01	PRGs
1,2-Dichloropropane	78-87-5	--	--	700	PRGs[c]	32.7	USEPA Reg 5	7.00E+02	PRGs
cis-1,3-Dichloropropene	10061-01-5	--	--	--	--	0.398	USEPA Reg 5	3.98E-01	USEPA Reg 5
trans-1,3-Dichloropropene	10061-02-6	--	--	--	--	0.398	USEPA Reg 5	3.98E-01	USEPA Reg 5
Dieldrin	60-57-1	0.0049	mammalian EcoSSL for Dieldrin	--	--	0.00238	USEPA Reg 5	4.90E-03	mammalian EcoSSL for Dieldrin
O,O-Diethyl O-2-pyrazinylphosphorothioate	297-97-2	--	--	--	--	0.799	USEPA Reg 5	7.99E-01	USEPA Reg 5
Diethylphthalate	84-66-2	--	--	100	PRGs	24.8	USEPA Reg 5	1.00E+02	PRGs
Dimethoate	60-51-5	--	--	--	--	0.218	USEPA Reg 5	2.18E-01	USEPA Reg 5
Dimethylphthalate	131-11-3	--	--	200	PRGs[c]	734	USEPA Reg 5	2.00E+02	PRGs
3,3'-Dimethylbenzidine	119-93-7	--	--	--	--	0.104	USEPA Reg 5	1.04E-01	USEPA Reg 5
7,12'-Dimethylbenz(a)anthracene	57-97-6	--	--	--	--	16.3	USEPA Reg 5	1.63E+01	USEPA Reg 5
alpha,alpha-Dimethylphenethylamine	122-09-8	--	--	--	--	0.3	USEPA Reg 5	3.00E-01	USEPA Reg 5
2,4-Dimethylphenol	105-67-9	--	--	--	--	0.01	USEPA Reg 5	1.00E-02	USEPA Reg 5
Di-n-butyl phthalate	84-74-2	--	--	200	PRGs	0.15	USEPA Reg 5	2.00E+02	PRGs
Di-n-octylphthalate	117-84-0	--	--	--	--	709	USEPA Reg 5	7.09E+02	USEPA Reg 5
1,3-Dinitrobenzene	99-65-0	--	--	--	--	0.655	USEPA Reg 5	6.55E-01	USEPA Reg 5
2,4-Dinitrophenol	51-28-5	--	--	20	PRGs	0.0609	USEPA Reg 5	2.00E+01	PRGs
2,4-Dinitrotoluene	121-14-2	--	--	--	--	1.28	USEPA Reg 5	1.28E+00	USEPA Reg 5
2,6-Dinitrotoluene	606-20-2	--	--	--	--	0.0328	USEPA Reg 5	3.28E-02	USEPA Reg 5
4,6-Dinitro-2-methylphenol	534-52-1	--	--	--	--	0.144	USEPA Reg 5	1.44E-01	USEPA Reg 5
Dinoseb	88-85-7	--	--	--	--	0.0218	USEPA Reg 5	2.18E-02	USEPA Reg 5

Table H-5. Ecological Screening Values for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a]		USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
1,4-Dioxane	123-91-1	--	--	--	--	2.05	USEPA Reg 5	2.05E+00	USEPA Reg 5
Diphenylamine	122-39-4	--	--	--	--	1.01	USEPA Reg 5	1.01E+00	USEPA Reg 5
Disulfoton	298-04-4	--	--	--	--	0.0199	USEPA Reg 5	1.99E-02	USEPA Reg 5
Endosulfan I (alpha)	959-98-8	--	--	--	--	0.119	USEPA Reg 5	1.19E-01	USEPA Reg 5
Endosulfan II (beta)	33213-65-9	--	--	--	--	0.119	USEPA Reg 5	1.19E-01	USEPA Reg 5
Endosulfan, mixed isomers	115-29-7	--	--	--	--	--	--	No ESV	No Source
Endosulfan sulfate	1031-07-8	--	--	--	--	0.0358	USEPA Reg 5	3.58E-02	USEPA Reg 5
Endrin	72-20-8	--	--	--	--	0.0101	USEPA Reg 5	1.01E-02	USEPA Reg 5
Endrin aldehyde	7421-93-4	--	--	--	--	0.0105	USEPA Reg 5	1.05E-02	USEPA Reg 5
Ethyl metharcrylate	97-63-2	--	--	--	--	30	USEPA Reg 5	3.00E+01	USEPA Reg 5
Ethylbenzene	100-41-4	--	--	--	--	5.16	USEPA Reg 5	5.16E+00	USEPA Reg 5
Famphur	52-85-7	--	--	--	--	0.0497	USEPA Reg 5	4.97E-02	USEPA Reg 5
Fluoranthene	206-44-0	--	--	--	--	122	USEPA Reg 5	1.22E+02	USEPA Reg 5
Fluorene	86-73-7	--	--	30	PRGs[c]	122	USEPA Reg 5	3.00E+01	PRGs
Furan	110-00-9	--	--	600	PRGs	--	--	6.00E+02	PRGs
Heptane	142-82-5	--	--	--	--	--	--	No ESV	No Source
Heptachlor	76-44-8	--	--	--	--	0.00598	USEPA Reg 5	5.98E-03	USEPA Reg 5
Heptachlor Epoxide	1024-57-3	--	--	--	--	0.152	USEPA Reg 5	1.52E-01	USEPA Reg 5
Hexachlorobenzene	118-74-1	--	--	--	--	0.199	USEPA Reg 5	1.99E-01	USEPA Reg 5
Hexachlorobutadiene	87-68-3	--	--	--	--	0.0398	USEPA Reg 5	3.98E-02	USEPA Reg 5
Hexachlorocyclopentadiene	77-47-4	--	--	10	PRGs	0.755	USEPA Reg 5	1.00E+01	PRGs
Hexachloroethane	67-72-1	--	--	--	--	0.596	USEPA Reg 5	5.96E-01	USEPA Reg 5
Hexachorophene	70-30-4	--	--	--	--	0.199	USEPA Reg 5	1.99E-01	USEPA Reg 5
2-Hexanone	591-78-6	--	--	--	--	12.6	USEPA Reg 5	1.26E+01	USEPA Reg 5
HMX	2691-41-0	--	--	--	--	--	--	No ESV	No Source
Indeno(1,2,3-cd)pyrene	193-39-5	--	--	--	--	109	USEPA Reg 5	1.09E+02	USEPA Reg 5
Isobutyl alcohol	78-83-1	--	--	--	--	20.8	USEPA Reg 5	2.08E+01	USEPA Reg 5

Table H-5. Ecological Screening Values for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a]		USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
Isodrin	465-73-6	--	--	--	--	0.00332	USEPA Reg 5	3.32E-03	USEPA Reg 5
Isophorone	78-59-1	--	--	--	--	139	USEPA Reg 5	1.39E+02	USEPA Reg 5
Isosafrole	120-58-1	--	--	--	--	9.94	USEPA Reg 5	9.94E+00	USEPA Reg 5
Kepone	143-50-0	--	--	--	--	0.0327	USEPA Reg 5	3.27E-02	USEPA Reg 5
Malathion	121-75-5	--	--	--	--	--	--	No ESV	No Source
Methacrylonitrile	126-98-7	--	--	--	--	0.057	USEPA Reg 5	5.70E-02	USEPA Reg 5
Methapyrilene	91-80-5	--	--	--	--	2.78	USEPA Reg 5	2.78E+00	USEPA Reg 5
Methoxychlor	72-43-5	--	--	--	--	0.0199	USEPA Reg 5	1.99E-02	USEPA Reg 5
Methyl iodide	74-88-4	--	--	--	--	1.23	USEPA Reg 5	1.23E+00	USEPA Reg 5
Methyl methacrylate	80-62-6	--	--	--	--	984	USEPA Reg 5	9.84E+02	USEPA Reg 5
Methyl methanesulfanate	66-27-3	--	--	--	--	0.315	USEPA Reg 5	3.15E-01	USEPA Reg 5
Methyl parathion	298-00-0	--	--	--	--	0.00029	USEPA Reg 5	2.92E-04	USEPA Reg 5
4-Methyl-2-pentanone	108-10-1	--	--	--	--	443	USEPA Reg 5	4.43E+02	USEPA Reg 5
3-Methylcholanthrene	56-49-5	--	--	--	--	0.0779	USEPA Reg 5	7.79E-02	USEPA Reg 5
Methylene bromide	74-95-3	--	--	--	--	65	USEPA Reg 5	6.50E+01	USEPA Reg 5
Methylene chloride	75-09-2	--	--	--	--	4.05	USEPA Reg 5	4.05E+00	USEPA Reg 5
2-Methylnaphthalene	91-57-6	--	--	--	--	3.24	USEPA Reg 5	3.24E+00	USEPA Reg 5
2-Methylphenol	95-48-7	--	--	--	--	40.4	USEPA Reg 5	4.04E+01	USEPA Reg 5
4-Methylphenol	106-44-5	--	--	--	--	163	USEPA Reg 5	1.63E+02	USEPA Reg 5
Mirex	2385-85-5	--	--	--	--	--	--	No ESV	No Source
Naphthalene	91-20-3	--	--	--	--	0.0994	USEPA Reg 5	9.94E-02	USEPA Reg 5
1,4-Naphthoquinone	130-15-4	--	--	--	--	1.67	USEPA Reg 5	1.67E+00	USEPA Reg 5
1-Naphthylamine	134-32-7	--	--	--	--	9.34	USEPA Reg 5	9.34E+00	USEPA Reg 5
2-Naphthylamine	91-59-8	--	--	--	--	3.03	USEPA Reg 5	3.03E+00	USEPA Reg 5
2-Nitroaniline	88-74-4	--	--	--	--	74.1	USEPA Reg 5	7.41E+01	USEPA Reg 5
3-Nitroaniline	99-09-2	--	--	--	--	3.16	USEPA Reg 5	3.16E+00	USEPA Reg 5
4-Nitroaniline	100-01-6	--	--	--	--	21.9	USEPA Reg 5	2.19E+01	USEPA Reg 5

Table H-5. Ecological Screening Values for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a]		USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
Nitrobenzene	99-95-3	--	--	40	PRGs[c]	1.31	USEPA Reg 5	4.00E+01	PRGs
Nitrocellulose	9004-70-0	--	--	--	--	--	--	No ESV	No Source
Nitroglycerin	55-63-0	--	--	--	--	--	--	No ESV	No Source
Nitroguanidine	556-88-7	--	--	--	--	--	--	No ESV	No Source
2-Nitrophenol	88-75-5	--	--	--	--	1.6	USEPA Reg 5	1.60E+00	USEPA Reg 5
4-Nitrophenol	100-02-7	--	--	7	PRGs	5.12	USEPA Reg 5	7.00E+00	PRGs
4-Nitroquinoline-1-oxide	56-57-5	--	--	--	--	0.122	USEPA Reg 5	1.22E-01	USEPA Reg 5
3-Nitrotoluene	99-08-1	--	--	--	--	--	--	No ESV	No Source
N-Nitrosodiethylamine	55-18-5	--	--	--	--	0.0693	USEPA Reg 5	6.93E-02	USEPA Reg 5
N-Nitrosodimethylamine	62-75-9	--	--	--	--	3.2E-05	USEPA Reg 5	3.21E-05	USEPA Reg 5
N-Nitrosodiphenylamine	86-30-6	--	--	20	PRGs[c]	0.545	USEPA Reg 5	2.00E+01	PRGs
N-Nitrosomethylethylamine	10595-95-6	--	--	--	--	0.00166	USEPA Reg 5	1.66E-03	USEPA Reg 5
N-Nitrosomorpholine	59-89-2	--	--	--	--	0.0706	USEPA Reg 5	7.06E-02	USEPA Reg 5
N-Nitrosopiperidine	100-75-4	--	--	--	--	0.00665	USEPA Reg 5	6.65E-03	USEPA Reg 5
N-Nitrosopyrrolidine	930-55-2	--	--	--	--	0.0126	USEPA Reg 5	1.26E-02	USEPA Reg 5
N-nitroso-di-n-propylamine	621-64-7	--	--	--	--	0.544	USEPA Reg 5	5.44E-01	USEPA Reg 5
2-Nitrotoluene	88-72-2	--	--	--	--	--	--	No ESV	No Source
5-nitro-o-Toluidine	99-55-8	--	--	--	--	8.73	USEPA Reg 5	8.73E+00	USEPA Reg 5
2,2'- oxybis(1-Chloropropane)	108-60-1	--	--	--	--	19.9	USEPA Reg 5	1.99E+01	USEPA Reg 5
Parathion	56-38-2	--	--	--	--	0.00034	USEPA Reg 5	3.40E-04	USEPA Reg 5
PCDDs	PCDD-S	--	--	--	--	2E-07	USEPA Reg 5	1.99E-07	USEPA Reg 5
Pentachloroaniline	527-20-8	--	--	100	PRGs[c]	--	--	1.00E+02	PRGs
Pentachlorobenzene	608-93-5	--	--	20	PRGs	0.497	USEPA Reg 5	2.00E+01	PRGs
Pentachloroethane	76-01-7	--	--	--	--	10.7	USEPA Reg 5	1.07E+01	USEPA Reg 5
Pentachloronitrobenzene	82-68-8	--	--	--	--	7.09	USEPA Reg 5	7.09E+00	USEPA Reg 5
Pentachlorophenol	87-86-5	2.1	avian EcoSSL for PCP	3	PRGs	0.119	USEPA Reg 5	2.10E+00	avian EcoSSL for PCP

Table H-5. Ecological Screening Values for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a]		USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
PETN	78-11-5	--	--	--	--	--	--	No ESV	No Source
Phenacetin	62-44-2	--	--	--	--	11.7	USEPA Reg 5	1.17E+01	USEPA Reg 5
Phenanthrene	85-01-8	--	--	--	--	45.7	USEPA Reg 5	4.57E+01	USEPA Reg 5
Phenol	108-95-2	--	--	30	PRGs	120	USEPA Reg 5	3.00E+01	PRGs
p-Phenylenediamine	106-50-3	--	--	--	--	6.16	USEPA Reg 5	6.16E+00	USEPA Reg 5
Phorate	298-02-2	--	--	--	--	0.0005	USEPA Reg 5	4.96E-04	USEPA Reg 5
2-Picoline	109-06-8	--	--	--	--	9.9	USEPA Reg 5	9.90E+00	USEPA Reg 5
Polychlorinated biphenyls	1336-36-3	--	--	0.371	PRGs	0.00033	USEPA Reg 5	3.71E-01	PRGs
Polychlorinated dibenzofurans	51207-31-9	--	--	--	--	3.9E-05	USEPA Reg 5	3.86E-05	USEPA Reg 5
Polynuclear aromatic hydrocarbons	130498-29-2	1.1	mammalian EcoSSL for HMW PAHs	--	--	--	--	1.10E+00	mammalian EcoSSL for HMW PAHs
Pronamide	23950-58-5	--	--	--	--	0.0136	USEPA Reg 5	1.36E-02	USEPA Reg 5
Propionitrile	107-12-0	--	--	--	--	0.0498	USEPA Reg 5	4.98E-02	USEPA Reg 5
4-Nitrotoluene	99-99-0	--	--	--	--	--	--	No ESV	No Source
Pyrene	129-00-0	--	--	--	--	78.5	USEPA Reg 5	7.85E+01	USEPA Reg 5
Pyridine	110-86-1	--	--	--	--	1.03	USEPA Reg 5	1.03E+00	USEPA Reg 5
RDX	121-82-4	--	--	--	--	--	--	No ESV	No Source
Safrole	94-59-7	--	--	--	--	0.404	USEPA Reg 5	4.04E-01	USEPA Reg 5
Silvex (2,4,5-TP)	93-72-1	--	--	--	--	0.109	USEPA Reg 5	1.09E-01	USEPA Reg 5
Styrene	100-42-5	--	--	300	PRGs	4.69	USEPA Reg 5	3.00E+02	PRGs
TCDD (2,3,7,8-Tetrachlorodibenzo-p-dioxin)	1746-01-6	--	--	3.15E-06	PRGs	2E-07	USEPA Reg 5	3.15E-06	PRGs
TCDF	51207-31-9	--	--	8.40E-04	PRGs	3.9E-05	USEPA Reg 5	8.40E-04	PRGs
2,3,5,6-Tetrachloroaniline	3481-20-7	--	--	20	PRGs	--	--	2.00E+01	PRGs
1,2,4,5-Tetrachlorobenzene	95-94-3	--	--	--	--	2.02	USEPA Reg 5	2.02E+00	USEPA Reg 5

Table H-5. Ecological Screening Values for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a]		USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
1,2,3,4-Tetrachlorobenzene	634-66-2	--	--	10	PRGs	--	--	1.00E+01	PRGs
1,1,1,2-Tetrachloroethane	630-20-6	--	--	--	--	225	USEPA Reg 5	2.25E+02	USEPA Reg 5
1,1,2,2-Tetrachloroethane	79-34-5	--	--	--	--	0.127	USEPA Reg 5	1.27E-01	USEPA Reg 5
Tetrachloroethene	127-18-4	--	--	--	--	9.92	USEPA Reg 5	9.92E+00	USEPA Reg 5
2,3,4,5-Tetrachlorophenol	4901-51-3	--	--	20	PRGs	--	--	2.00E+01	PRGs
2,3,4,6-Tetrachlorophenol	58-90-2	--	--	--	--	0.199	USEPA Reg 5	1.99E-01	USEPA Reg 5
Tetraethyl dithiopyrophosphate	3689-24-5	--	--	--	--	0.596	USEPA Reg 5	5.96E-01	USEPA Reg 5
Tetryl	479-45-8	--	--	--	--	--	--	No ESV	No Source
Toluene	108-88-3	--	--	200	PRGs	5.45	USEPA Reg 5	2.00E+02	PRGs
o-Toluidine	95-53-4	--	--	--	--	2.97	USEPA Reg 5	2.97E+00	USEPA Reg 5
4-Toluidine	106-49-0	--	--	--	--	--	--	No ESV	No Source
Toxaphene	8001-35-2	--	--	--	--	0.119	USEPA Reg 5	1.19E-01	USEPA Reg 5
2,4,5-Trichloroaniline	636-30-6	--	--	20	PRGs	--	--	2.00E+01	PRGs
1,2,3-Trichlorobenzene	87-61-6	--	--	20	PRGs	--	--	2.00E+01	PRGs
1,2,4-Trichlorobenzene	120-82-1	--	--	20	PRGs	11.1	USEPA Reg 5	2.00E+01	PRGs
1,1,1-Trichloroethane	71-55-6	--	--	--	--	29.8	USEPA Reg 5	2.98E+01	USEPA Reg 5
1,1,2-Trichloroethane	79-00-5	--	--	--	--	28.6	USEPA Reg 5	2.86E+01	USEPA Reg 5
Trichloroethene	79-01-6	--	--	--	--	12.4	USEPA Reg 5	1.24E+01	USEPA Reg 5
Trichlorofluoromethane	75-69-4	--	--	--	--	16.4	USEPA Reg 5	1.64E+01	USEPA Reg 5
2,4,5-Trichlorophenol	95-95-4	--	--	9	PRGs	14.1	USEPA Reg 5	9.00E+00	PRGs
2,4,6-Trichlorophenol	88-06-2	--	--	4	PRGs	9.94	USEPA Reg 5	4.00E+00	PRGs
1,2,3-Trichloropropane	96-18-4	--	--	--	--	3.36	USEPA Reg 5	3.36E+00	USEPA Reg 5
2,4,5-Trichlorophenoxyacetic acid	93-76-5	--	--	--	--	0.596	USEPA Reg 5	5.96E-01	USEPA Reg 5
O,O,O-Triethyl phosphorothioate	126-68-1	--	--	--	--	0.818	USEPA Reg 5	8.18E-01	USEPA Reg 5
1,3,5-Trinitrobenzene	99-35-4	--	--	--	--	0.376	USEPA Reg 5	3.76E-01	USEPA Reg 5

Table H-5. Ecological Screening Values for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) Preliminary Remediation Goals for Ecological Endpoints[a]		USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
2,4,6-Trinitrotoluene	118-96-7	--	--	--	--	--	--	No ESV	No Source
Vinyl acetate	108-05-4	--	--	--	--	12.7	USEPA Reg 5	1.27E+01	USEPA Reg 5
Vinyl chloride	75-01-4	--	--	--	--	0.646	USEPA Reg 5	6.46E-01	USEPA Reg 5
Xylenes (total)	1330-20-7	--	--	--	--	10	USEPA Reg 5	1.00E+01	USEPA Reg 5

Hierarchy of values found in updated Ohio EPA Risk Assessment Guidance, section 3.3.5: http://www.epa.ohio.gov/portals/30/rules/RR-031.pdf

EcoSSLs: http://www.epa.gov/ecotox/ecossl/ (USEPA 2010)

Ecological Screening Levels (ESLs), United States Environmental Protection Agency (USEPA) Region 5, 2003: http://www.epa.gov/reg5rcra/ca/edql.htm

[a]United States Department of Energy (DOE) (1997a). *Preliminary Remediation Goals for Ecological Endpoints*. ES/ER/TM-162/R2. August 1997.

[b]Values for which plant benchmark is lowest. According to DOE (1997a), the PRG is the lowest of three values (earthworm, plant, or wildlife). The only values shown in DOE 1997a are the ones for which the calculated value is lower than earthworm and plant values. Plant values found in: DOE 1997b. *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants*. ES/ER/TM-85/R3. November 1997.

[c]Values for which earthworm benchmark is lowest. According to DOE (1997a), the PRG is the lowest of three values (earthworm, plant, or wildlife). The only values shown in DOE 1997a are the ones for which the calculated value is lower than earthworm and plant values. Earthworm values found in: DOE 1997c. *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process*. ES/ER/TM-126/R2. November 1997.

[d]The preferred soil value is the EcoSSLs, followed by DOE (1997a), followed by USEPA Region 5 ESLs.

*Aluminum is identified as a chemical of potential concern (COPC) only at sites where the soil pH is less than 5.5

**In well-aerated soils between pH 5 and 8, iron is not expected to be toxic to plants. A determination of the geochemical conditions (i.e., pH and Eh at a minimum) of the environmental setting, as well as the presence of iron floc and the toxic metals, is critical to the determination of the relative importance of iron at an area of concern (AOC).

-- = no value

CAS = Chemical Abstract Service
EcoSSL = Ecological Soil Screening Level
Ohio EPA = Ohio Environmental Protection Agency
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine
COPEC = Chemical of Potential Concern
EDQL = Ecological Data Quality Level, superseded by ESLs
PRG = Preliminary Remediation Goal

Table H-6. Ecological Screening Values for Chemical Analytes in Sediment

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 Ecological Screening Levels (2003)[b] (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
Inorganic Chemicals							
Aluminum	7429-90-5	--	--	--	--	No ESV	No Source
Antimony	7440-36-0	--	--	--	--	No ESV	No Source
Arsenic	7440-38-2	9.79	MacDonald et al.	9.79	USEPA Reg 5	9.79E+00	MacDonald et al.
Barium	7440-39-3	--	--	--	--	No ESV	No Source
Beryllium	7440-41-7	--	--	--	--	No ESV	No Source
Cadmium	7440-43-9	0.99	MacDonald et al.	0.99	USEPA Reg 5	9.90E-01	MacDonald et al.
Calcium	7440-70-2	--	--	--	--	No ESV	No Source
Chromium, Trivalent	7440-47-3	43.4	MacDonald et al.	43.4	USEPA Reg 5	4.34E+01	MacDonald et al.
Chromium, Hexavalent	18540-29-9	--	--	--	--	No ESV	No Source
Cobalt	7440-48-4	--	--	50	USEPA Reg 5	5.00E+01	USEPA Reg 5
Copper	7440-50-8	31.6	MacDonald et al.	31.6	USEPA Reg 5	3.16E+01	MacDonald et al.
Cyanide	57-12-5	--	--	0.0001	USEPA Reg 5	1.00E-04	USEPA Reg 5
Iron	7439-89-6	--	--	--	--	No ESV	No Source
Lead	7439-92-1	35.8	MacDonald et al.	35.8	USEPA Reg 5	3.58E+01	MacDonald et al.
Magnesium	7439-95-4	--	--	--	--	No ESV	No Source
Manganese	7439-96-5	--	--	--	--	No ESV	No Source
Mercury	7439-97-6	0.18	MacDonald et al.	0.174	USEPA Reg 5	1.80E-01	MacDonald et al.
Mercury, methyl	22967-92-6	--	--	0.00001	USEPA Reg 5	1.00E-05	USEPA Reg 5
Nickel	7440-02-0	22.7	MacDonald et al.	22.7	USEPA Reg 5	2.27E+01	MacDonald et al.
Potassium	7440-07-7	--	--	--	--	No ESV	No Source

Table H-6. Ecological Screening Values for Chemical Analytes in Sediment (continued)

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 Ecological Screening Levels (2003)[b] (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
Selenium	7782-49-2	--	--	--	--	No ESV	No Source
Silver	7440-22-4	--	--	0.5	USEPA Reg 5	5.00E-01	USEPA Reg 5
Sodium	7440-23-5	--	--	--	--	No ESV	No Source
Thallium	7440-28-0	--	--	--	--	No ESV	No Source
Vanadium	7440-62-2	--	--	--	--	No ESV	No Source
Zinc	7440-66-6	121	MacDonald et al.	121	USEPA Reg 5	1.21E+02	MacDonald et al.
Anions							
Sulfate	14808-79-8	--	--	--	--	No ESV	No Source
Sulfide	18496-25-8	--	--	--	--	No ESV	No Source
Organic Chemicals							
Acenaphthene	83-32-9	--	--	0.00671	USEPA Reg 5	6.71E-03	USEPA Reg 5
Acenaphthylene	208-96-8	--	--	0.00587	USEPA Reg 5	5.87E-03	USEPA Reg 5
Acetone	67-64-1	--	--	0.0099	USEPA Reg 5	9.90E-03	USEPA Reg 5
Acetonitrile	75-05-8	--	--	0.056	USEPA Reg 5	5.60E-02	USEPA Reg 5
Acetylaminofluorene[2-]	53-96-3	--	--	0.0153	USEPA Reg 5	1.53E-02	USEPA Reg 5
Acrolein	107-02-8	--	--	1.52E-06	USEPA Reg 5	1.52E-06	USEPA Reg 5
Acrylonitrile	107-13-1	--	--	0.0012	USEPA Reg 5	1.20E-03	USEPA Reg 5
Aldrin	309-00-2	--	--	0.002	USEPA Reg 5	2.00E-03	USEPA Reg 5
Aniline	62-53-3	--	--	0.00031	USEPA Reg 5	3.10E-04	USEPA Reg 5
Anthracene	120-12-7	0.0572	MacDonald et al.	0.0572	USEPA Reg 5	5.72E-02	MacDonald et al.
PCB-1016	12674-11-2	--	--	--	--	No ESV	No Source
Arochlor-1221	11104-28-2	--	--	--	--	No ESV	No Source
Arochlor-1232	11141-16-5	--	--	--	--	No ESV	No Source
Arochlor-1242	53469-21-9	--	--	--	--	No ESV	No Source
Arochlor-1248	12672-29-6	--	--	--	--	No ESV	No Source
PCB-1254	11097-69-1	--	--	--	--	No ESV	No Source
PCB-1260	11096-82-5	--	--	--	--	No ESV	No Source
Aramite	140-57-8	--	--	1.11E-06	USEPA Reg 5	1.11E-06	USEPA Reg 5
Azobenzene[p-(dimethylamino)]	60-11-7	--	--	0.318	USEPA Reg 5	3.18E-01	USEPA Reg 5
Benzene	71-43-2	--	--	0.142	USEPA Reg 5	1.42E-01	USEPA Reg 5
Benzenemethanol	100-51-6	--	--	0.00104	USEPA Reg 5	1.04E-03	USEPA Reg 5
Benz(a)anthracene	56-55-3	0.108	MacDonald et al.	0.108	USEPA Reg 5	1.08E-01	MacDonald et al.
Benzo(a)pyrene	50-32-8	0.15	MacDonald et al.	0.15	USEPA Reg 5	1.50E-01	MacDonald et al.
Benzo(b)fluoranthene	205-99-2	--	--	10.4	USEPA Reg 5	1.04E+01	USEPA Reg 5
Benzo(g,h,i)perylene	191-24-2	--	--	0.17	USEPA Reg 5	1.70E-01	USEPA Reg 5

Table H-6. Ecological Screening Values for Chemical Analytes in Sediment (continued)

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 Ecological Screening Levels (2003)[b] (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
Benzo(k)fluoranthene	207-08-9	--	--	0.24	USEPA Reg 5	2.40E-01	USEPA Reg 5
BHC	608-73-1	--	--	--	--	No ESV	No Source
BHC, alpha	319-84-6	--	--	0.006	USEPA Reg 5	6.00E-03	USEPA Reg 5
BHC, beta	319-85-7	--	--	0.005	USEPA Reg 5	5.00E-03	USEPA Reg 5
BHC, delta	319-86-8	--	--	71.5	USEPA Reg 5	7.15E+01	USEPA Reg 5
BHC, gamma (Lindane)	58-89-9	0.00237	MacDonald et al.	0.00237	USEPA Reg 5	2.37E-03	MacDonald et al.
Biphenyl	92-52-4	--	--	--	--	No ESV	No Source
bis(2-chloroethoxy) methane	111-91-1	--	--	--	--	No ESV	No Source
bis(2-Chloroethyl) ether	111-44-4	--	--	3.52	USEPA Reg 5	3.52E+00	USEPA Reg 5
bis(2-Ethylhexyl)phthalate	117-81-7	--	--	0.182	USEPA Reg 5	1.82E-01	USEPA Reg 5
Bromodichloromethane	74-97-5	--	--	--	--	No ESV	No Source
Bromoform	75-25-2	--	--	0.492	USEPA Reg 5	4.92E-01	USEPA Reg 5
Bromomethane	74-83-9	--	--	0.0137	USEPA Reg 5	1.37E-02	USEPA Reg 5
4-bromophenyl-phenylether	101-55-3	--	--	1.55	USEPA Reg 5	1.55E+00	USEPA Reg 5
2-Butanone	78-93-3	--	--	0.0424	USEPA Reg 5	4.24E-02	USEPA Reg 5
Butylbenzylphthalate	85-68-7	--	--	1.97	USEPA Reg 5	1.97E+00	USEPA Reg 5
Carbazole	86-74-8	--	--	--	--	No ESV	No Source
Carbon disulfide	75-15-0	--	--	0.0239	USEPA Reg 5	2.39E-02	USEPA Reg 5
Carbon tetrachloride	56-23-5	--	--	1.45	USEPA Reg 5	1.45E+00	USEPA Reg 5
Chlordane	57-74-9	0.00324	MacDonald et al.	0.00324	USEPA Reg 5	3.24E-03	MacDonald et al.
gamma-Chlordane	12789-03-6	--	--	0.00324	value for chlordane	3.24E-03	value for chlordane
Total Organic Carbon	--	--	--	--	--	No ESV	No Source
4-Chloroaniline	106-47-8	--	--	0.146	USEPA Reg 5	1.46E-01	USEPA Reg 5
Chlorobenzene	108-90-7	--	--	0.291	USEPA Reg 5	2.91E-01	USEPA Reg 5
Chlorobenzilate	510-15-6	--	--	0.86	USEPA Reg 5	8.60E-01	USEPA Reg 5
Chloroethane	75-00-3	--	--	--	--	No ESV	No Source
Chloroform	67-66-3	--	--	0.121	USEPA Reg 5	1.21E-01	USEPA Reg 5
Chloromethane	74-87-3	--	--	--	--	No ESV	No Source
2-Chloronaphthalene	91-58-7	--	--	0.417	USEPA Reg 5	4.17E-01	USEPA Reg 5
2-Chlorophenol	95-57-8	--	--	0.0319	USEPA Reg 5	3.19E-02	USEPA Reg 5
4-Chlorophenyl-phenyl ether	7005-72-3	--	--	--	--	No ESV	No Source
4-chloro-3-methylphenol	59-50-7	--	--	0.388	USEPA Reg 5	3.88E-01	USEPA Reg 5
Chrysene	218-01-9	0.166	MacDonald et al.	0.166	USEPA Reg 5	1.66E-01	MacDonald et al.
m-Cresol	108-39-4	--	--	0.0524	USEPA Reg 5	5.24E-02	USEPA Reg 5
2,4-D	94-75-7	--	--	1.273	USEPA Reg 5	1.27E+00	USEPA Reg 5

Table H-6. Ecological Screening Values for Chemical Analytes in Sediment (continued)

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 Ecological Screening Levels (2003)[b] (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
4,4'-DDD	72-54-8	0.00488	MacDonald et al.	0.00488	USEPA Reg 5	4.88E-03	MacDonald et al.
4,4'-DDE	72-55-9	0.00316	MacDonald et al.	0.00316	USEPA Reg 5	3.16E-03	MacDonald et al.
4,4'-DDT	50-29-3	0.00416	MacDonald et al.	0.00416	USEPA Reg 5	4.16E-03	MacDonald et al.
Diazinon	333-41-5	--	--	--	--	No ESV	No Source
Dibenz(a,h)anthracene	53-70-3	0.033	MacDonald et al.	0.033	USEPA Reg 5	3.30E-02	MacDonald et al.
Dibenzofuran	132-64-9	--	--	0.449	USEPA Reg 5	4.49E-01	USEPA Reg 5
Dibromochloromethane	124-48-1	--	--	--	--	No ESV	No Source
1,2-Dichlorobenzene	95-50-1	--	--	0.294	USEPA Reg 5	2.94E-01	USEPA Reg 5
1,3-Dichlorobenzene	541-73-1	--	--	1.315	USEPA Reg 5	1.32E+00	USEPA Reg 5
1,4-Dichlorobenzene	106-46-7	--	--	0.318	USEPA Reg 5	3.18E-01	USEPA Reg 5
3,3'-Dichlorobenzidine	91-94-1	--	--	0.127	USEPA Reg 5	1.27E-01	USEPA Reg 5
1,1-Dichloroethane	75-34-3	--	--	0.000575	USEPA Reg 5	5.75E-04	USEPA Reg 5
1,2-Dichloroethane	107-06-2	--	--	0.26	USEPA Reg 5	2.60E-01	USEPA Reg 5
1,1-Dichloroethene	75-35-4	--	--	0.0194	USEPA Reg 5	1.94E-02	USEPA Reg 5
1,2-Dichloroethene	540-59-0	--	--	0.654	USEPA Reg 5 (for trans form)	6.54E-01	USEPA Reg 5 (for trans form)
2,4-Dichlorophenol	120-83-2	--	--	0.0817	USEPA Reg 5	8.17E-02	USEPA Reg 5
1,2-Dichloropropane	78-87-5	--	--	0.333	USEPA Reg 5	3.33E-01	USEPA Reg 5
cis-1,3-Dichloropropene	10061-02-6	--	--	--	--	No ESV	No Source
trans-1,3-Dichloropropene	10061-02-6	--	--	--	--	No ESV	No Source
Dieldrin	60-57-1	0.0019	MacDonald et al.	0.0019	USEPA Reg 5	1.90E-03	MacDonald et al.
Diethylphthalate	84-66-2	--	--	0.295	USEPA Reg 5	2.95E-01	USEPA Reg 5
Dimethylphthalate	131-11-3	--	--	--	--	No ESV	No Source
7,12'-Dimethylbenz(a)anthracene	57-97-6	--	--	66.4	USEPA Reg 5	6.64E+01	USEPA Reg 5
2,4-Dimethylphenol	105-67-9	--	--	0.304	USEPA Reg 5	3.04E-01	USEPA Reg 5
Di-n-butyl phthalate	84-74-2	--	--	1.114	USEPA Reg 5	1.11E+00	USEPA Reg 5
Di-n-octylphthalate	117-84-0	--	--	40.6	USEPA Reg 5	4.06E+01	USEPA Reg 5
1,3-Dinitrobenzene	99-65-0	--	--	0.00861	USEPA Reg 5	8.61E-03	USEPA Reg 5
2,4-Dinitrophenol	51-28-5	--	--	0.00621	USEPA Reg 5	6.21E-03	USEPA Reg 5
2,4-Dinitrotoluene	121-14-2	--	--	0.0144	USEPA Reg 5	1.44E-02	USEPA Reg 5
2,6-Dinitrotoluene	606-20-2	--	--	0.0398	USEPA Reg 5	3.98E-02	USEPA Reg 5
2-Amino-4,6-Dinitrotoluene	35572-78-2	--	--	--	--	No ESV	No Source
4-Amino-2,6-Dinitrotoluene	19406-51-0	--	--	--	--	No ESV	No Source
4,6-Dinitro-2-methylphenol	534-52-1	--	--	0.0104	USEPA Reg 5	1.04E-02	USEPA Reg 5
Dinoseb	88-85-7	--	--	0.0145	USEPA Reg 5	1.45E-02	USEPA Reg 5

Table H-6. Ecological Screening Values for Chemical Analytes in Sediment (continued)

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 Ecological Screening Levels (2003)[b] (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
1,4-Dioxane	123-91-1	--	--	0.119	USEPA Reg 5	1.19E-01	USEPA Reg 5
Diphenylamine	122-39-4	--	--	0.0346	USEPA Reg 5	3.46E-02	USEPA Reg 5
Disulfoton	298-04-4	--	--	0.324	USEPA Reg 5	3.24E-01	USEPA Reg 5
Endosulfan I (alpha)	959-98-8	--	--	0.00326	USEPA Reg 5	3.26E-03	USEPA Reg 5
Endosulfan II (beta)	33213-65-9	--	--	0.00194	USEPA Reg 5	1.94E-03	USEPA Reg 5
Endosulfan, mixed isomers	115-29-7	--	--	--	--	No ESV	No Source
Endosulfan sulfate	1031-07-8	--	--	0.0346	USEPA Reg 5	3.46E-02	USEPA Reg 5
Endrin	72-20-8	0.00222	MacDonald et al.	0.00222	USEPA Reg 5	2.22E-03	MacDonald et al.
Endrin Aldehyde	7421-93-4	--	--	0.48	USEPA Reg 5	4.80E-01	USEPA Reg 5
Ethylbenzene	100-41-4	--	--	0.175	USEPA Reg 5	1.75E-01	USEPA Reg 5
Fluoranthene	206-44-0	0.423	MacDonald et al.	0.423	USEPA Reg 5	4.23E-01	MacDonald et al.
Fluorene	86-73-7	0.0774	MacDonald et al.	0.0774	USEPA Reg 5	7.74E-02	MacDonald et al.
Heptachlor	76-44-8	--	--	0.0006	USEPA Reg 5	6.00E-04	USEPA Reg 5
Heptachlor Epoxide	1024-57-3	0.00247	MacDonald et al.	0.00247	USEPA Reg 5	2.47E-03	MacDonald et al.
Hexachlorobenzene	118-74-1	--	--	0.02	USEPA Reg 5	2.00E-02	USEPA Reg 5
Hexachlorobutadiene	87-68-3	--	--	0.0265	USEPA Reg 5	2.65E-02	USEPA Reg 5
Hexachlorocyclopentadiene	77-47-4	--	--	0.901	USEPA Reg 5	9.01E-01	USEPA Reg 5
Hexachloroethane	67-72-1	--	--	0.584	USEPA Reg 5	5.84E-01	USEPA Reg 5
Hexachorophene	70-30-4	--	--	231	USEPA Reg 5	2.31E+02	USEPA Reg 5
2-Hexanone	591-78-6	--	--	0.0582	USEPA Reg 5	5.82E-02	USEPA Reg 5
HMX Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	2691-41-0	--	--	--	--	No ESV	No Source
Indeno(1,2,3-cd)pyrene	193-39-5	--	--	0.2	USEPA Reg 5	2.00E-01	USEPA Reg 5
Isodrin	465-73-6	--	--	0.0552	USEPA Reg 5	5.52E-02	USEPA Reg 5
Isophorone	78-59-1	--	--	0.432	USEPA Reg 5	4.32E-01	USEPA Reg 5
Kepone	143-50-0	--	--	0.00331	USEPA Reg 5	3.31E-03	USEPA Reg 5
Malathion	121-75-5	--	--	--	--	No ESV	No Source
Methoxychlor	72-43-5	--	--	0.0136	USEPA Reg 5	1.36E-02	USEPA Reg 5
Methyl methacrylate	80-62-6	--	--	0.168	USEPA Reg 5	1.68E-01	USEPA Reg 5
4-Methyl-2-pentanone	108-10-1	--	--	0.0251	USEPA Reg 5	2.51E-02	USEPA Reg 5
3-Methylcholanthrene	56-49-5	--	--	8190	USEPA Reg 5	8.19E+03	USEPA Reg 5
Methylene chloride	75-09-2	--	--	0.159	USEPA Reg 5	1.59E-01	USEPA Reg 5
2-Methylnaphthalene	91-57-6	--	--	0.0202	USEPA Reg 5	2.02E-02	USEPA Reg 5
2-Methylphenol	95-48-7	--	--	0.0554	USEPA Reg 5	5.54E-02	USEPA Reg 5
4-Methylphenol	106-44-5	--	--	0.0202	USEPA Reg 5	2.02E-02	USEPA Reg 5

Table H-6. Ecological Screening Values for Chemical Analytes in Sediment (continued)

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 Ecological Screening Levels (2003)[b] (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
Mirex	2385-85-5	--	--	--	--	No ESV	No Source
Naphthalene	91-20-3	0.176	MacDonald et al.	0.176	USEPA Reg 5	1.76E-01	MacDonald et al.
2-Nitroaniline	88-74-4	--	--	--	--	No ESV	No Source
3-Nitroaniline	99-09-2	--	--	--	--	No ESV	No Source
4-Nitroaniline	100-01-6	--	--	--	--	No ESV	No Source
Nitrobenzene	99-95-3	--	--	0.145	USEPA Reg 5	1.45E-01	USEPA Reg 5
Nitrocellulose	9004-70-0	--	--	--	--	No ESV	No Source
Nitroglycerin	55-63-0	--	--	--	--	No ESV	No Source
Nitroguanidine	556-88-7	--	--	--	--	No ESV	No Source
2-Nitrophenol	88-75-5	--	--	--	--	No ESV	No Source
4-Nitrophenol	100-02-7	--	--	0.0133	USEPA Reg 5	1.33E-02	USEPA Reg 5
m-Nitrotoluene	99-08-1	--	--	--	--	No ESV	No Source
N-Nitrosodiethylamine	55-18-5	--	--	0.0228	USEPA Reg 5	2.28E-02	USEPA Reg 5
N-nitroso-di-n-dipropylamine	621-64-7	--	--	--	--	No ESV	No Source
N-nitrosodiphenylamine	86-30-6	--	--	--	--	No ESV	No Source
o-Nitrotoluene	88-72-2	--	--	--	--	No ESV	No Source
2,2'- oxybis(1-Chloropropane)	108-60-1	--	--	--	--	No ESV	No Source
Parathion	56-38-2	--	--	0.000757	USEPA Reg 5	7.57E-04	USEPA Reg 5
PCDDs	PCDD-S	--	--	0.000011	USEPA Reg 5	1.10E-05	USEPA Reg 5
Pentachlorobenzene	608-93-5	--	--	0.024	USEPA Reg 5	2.40E-02	USEPA Reg 5
Pentachloroethane	76-01-7	--	--	0.689	USEPA Reg 5	6.89E-01	USEPA Reg 5
Pentachlorophenol	87-86-5	--	--	23	USEPA Reg 5	2.30E+01	USEPA Reg 5
Phenanthrene	85-01-8	0.204	MacDonald et al.	0.204	USEPA Reg 5	2.04E-01	MacDonald et al.
Phenol	108-95-2	--	--	0.0491	USEPA Reg 5	4.91E-02	USEPA Reg 5
Phorate	298-02-2	--	--	0.000861	USEPA Reg 5	8.61E-04	USEPA Reg 5
Polynuclear aromatic hydrocarbons	130498-29-2	1.61	MacDonald et al.	--	--	1.61E+00	MacDonald et al.
Polychlorinated biphenyls	1336-36-3	0.0598	MacDonald et al.	0.0598	USEPA Reg 5	5.98E-02	MacDonald et al.
p-Nitrotoluene	99-99-0	--	--	--	--	No ESV	No Source
Pyrene	129-00-0	0.195	MacDonald et al.	0.195	USEPA Reg 5	1.95E-01	MacDonald et al.
Pyridine	110-86-1	--	--	0.106	USEPA Reg 5	1.06E-01	USEPA Reg 5
RDX (cyclonite) Hexahydro-1,3,5-trinitro-1,3,5-triazine	121-82-4	--	--	--	--	No ESV	No Source
Silvex (2,4,5-TP)	93-72-1	--	--	0.675	USEPA Reg 5	6.75E-01	USEPA Reg 5
Styrene	100-42-5	--	--	0.254	USEPA Reg 5	2.54E-01	USEPA Reg 5
1,2,4,5-Tetrachlorobenzene	95-94-3	--	--	1.252	USEPA Reg 5	1.25E+00	USEPA Reg 5

Table H-6. Ecological Screening Values for Chemical Analytes in Sediment (continued)

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 Ecological Screening Levels (2003)[b] (update of 1998 EDQLs)		Preferred Ecological Screening Value (ESV)[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6	--	--	1.20E-07	USEPA Reg 5	1.20E-07	USEPA Reg 5
1,1,2,2-Tetrachloroethane	79-34-5	--	--	0.85	USEPA Reg 5	8.50E-01	USEPA Reg 5
Tetrachloroethene	127-18-4	--	--	0.99	USEPA Reg 5	9.90E-01	USEPA Reg 5
2,3,4,6-Tetrachlorophenol	58-90-2	--	--	0.129	USEPA Reg 5	1.29E-01	USEPA Reg 5
Tetraethyl dithiopyrophosphate	3689-24-5	--	--	0.56	USEPA Reg 5	5.60E-01	USEPA Reg 5
Tetryl	479-45-8	--	--	--	--	No ESV	No Source
Toluene	108-88-3	--	--	1.22	USEPA Reg 5	1.22E+00	USEPA Reg 5
Toxaphene	8001-35-2	--	--	0.000077	USEPA Reg 5	7.70E-05	USEPA Reg 5
1,2,4-Trichlorobenzene	120-82-1	--	--	5.062	USEPA Reg 5	5.06E+00	USEPA Reg 5
1,1,1-Trichloroethane	71-55-6	--	--	0.213	USEPA Reg 5	2.13E-01	USEPA Reg 5
1,1,2-Trichloroethane	79-00-5	--	--	0.518	USEPA Reg 5	5.18E-01	USEPA Reg 5
Trichloroethene	79-01-6	--	--	0.112	USEPA Reg 5	1.12E-01	USEPA Reg 5
2,4,5-Trichlorophenol	95-95-4	--	--	--	--	No ESV	No Source
2,4,6-Trichlorophenol	88-06-2	--	--	0.208	USEPA Reg 5	2.08E-01	USEPA Reg 5
2,4,5-Trichlorophenoxyacetic acid	93-76-5	--	--	58.7	USEPA Reg 5	5.87E+01	USEPA Reg 5
O,O,O-Triethyl phosphorothioate	126-68-1	--	--	0.189	USEPA Reg 5	1.89E-01	USEPA Reg 5
1,3,5-Trinitrobenzene	99-35-4	--	--	--	--	No ESV	No Source
2,4,6-Trinitrotoluene	118-96-7	--	--	--	--	No ESV	No Source
Vinyl acetate	108-05-4	--	--	0.013	USEPA Reg 5	1.30E-02	USEPA Reg 5
Vinyl chloride	75-01-4	--	--	0.202	USEPA Reg 5	2.02E-01	USEPA Reg 5
Xylenes (total)	1330-20-7	--	--	0.433	USEPA Reg 5	4.33E-01	USEPA Reg 5

[a]D.D. MacDonald, C.G. Ingersoll, T.A. Berger. *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems*. Archives of Environmental Contamination and Toxicology 39, 20–31 (2000).

[b]Ecological Screening Levels (ESLs), United States Environmental Protection Agency (USEPA) Region 5, 2003: http://www.epa.gov/reg5rcra/ca/edql.htm

[c]The preferred sediment screening value is MacDonald et al. followed by USEPA Region 5 ESLs.

-- = no value

MacDonald et al = consensus-based threshold effect concentrations (TECs)

CAS = Chemical Abstract Service

EDQL = Ecological Data Quality Levels

Reg = Region

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Table H-7. Ecological Screening Values for Chemical Analytes in Surface Water

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio Administrative Code (µg/L)[a]		Updated values for Suter and Tsao 1996[b]				USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)[c]		Preferred Surface Water Value[d]	
				NAWQC 2009 update		Tier II values					
		OMZM (Outside Mixing Zone Max)	OMZA (Outside Mixing Zone Average)	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
Inorganic Chemicals											
Aluminum	7429-90-5	--	--	87	NAWQC 2009	100	Tier II (GLI database)	--	--	8.70E+01	NAWQC 2009
Ammonia	7664-41-7	500	100	--	--	--	--	--	--	1.00E+02	Ohio Administrative Code
Antimony	7440-36-0	900	190	--	--	30	Tier II (Suter & Tsao 1996)	80	USEPA Reg 5	1.90E+02	Ohio Administrative Code
Arsenic III (Diss)	7440-38-2	340	150	150	NAWQC 2009	--	--	--	--	1.50E+02	Ohio Administrative Code
Arsenic	7440-38-2	340	150	--	--	--	--	148	USEPA Reg 5	1.50E+02	Ohio Administrative Code
Arsenic V (Diss)	7440-38-2	--	--	--	--	3.1	Tier II (Suter & Tsao 1996)	--	--	3.10E+00	Tier II (Suter & Tsao 1996)
Barium	7440-39-3	2,000	220	--	--	4.0	Tier II (Suter & Tsao 1996)	220	USEPA Reg 5	2.20E+02	Ohio Administrative Code
Beryllium	7440-41-7	93	11	--	--	0.66	Tier II (Suter & Tsao 1996)	3.6	USEPA Reg 5	1.10E+01	Ohio Administrative Code
Boron	7440-42-8	33,000	3,900	--	--	1.6	Tier II (Suter & Tsao 1996)	--	--	3.90E+03	Ohio Administrative Code
Cadmium	7440-43-9	4.5	2.5	--	--	0.2	Tier II (Suter & Tsao 1996)	0.15	USEPA Reg 5	2.50E+00	Ohio Administrative Code
Cadmium (Diss)	7440-43-9	4.3	2.2	0.25	NAWQC 2009	--	--	--	--	2.20E+00	Ohio Administrative Code
Calcium	7440-70-2	--	--	--	--	--	--	--	--	No ESV	No Source
Chlorine (total residual)	7782-50-5	19	11	11	NAWQC 2009	5	Tier II (GLI database)	--	--	1.10E+01	Ohio Administrative Code
Chromium III (Diss)	7440-47-3	570	74	74	NAWQC 2009	210	Tier II (Suter & Tsao 1996)	42	USEPA Reg 5	7.40E+01	Ohio Administrative Code
Chromium	7440-47-3	1,800	86	--	--	--	--	42	USEPA Reg 5	8.60E+01	Ohio Administrative Code
Chromium VI (Diss)	7440-47-3	16	11	11	NAWQC 2009	11	Tier II (Suter & Tsao 1996)	--	--	1.10E+01	Ohio Administrative Code
Cobalt	7440-48-4	220	24	--	--	23	Tier II (Suter & Tsao 1996)	24	USEPA Reg 5	2.40E+01	Ohio Administrative Code
Copper (Diss)	7440-50-8	13	9	1.45	NAWQC 2009	--	--	--	--	9.00E+00	Ohio Administrative Code
Copper	7440-50-8	14	9.3	--	--	--	--	1.58	USEPA Reg 5	9.30E+00	Ohio Administrative Code
Cyanide	57-12-5	22	5.2	5.2	NAWQC 2009	--	--	5.2	USEPA Reg 5	5.20E+00	Ohio Administrative Code
Iron	7439-89-6	--	--	1,000	NAWQC 2009	300	Tier II (GLI database)	--	--	1.00E+03	NAWQC 2009
Lead (Diss)	7439-92-1	97	5.1	2.5	NAWQC 2009	--	--	--	--	5.10E+00	Ohio Administrative Code
Lead	7439-92-1	120	6.4	--	--	--	--	1.17	USEPA Reg 5	6.40E+00	Ohio Administrative Code
Lithium	7439-93-2	--	--	--	--	14	Tier II (Suter & Tsao 1996)	--	--	1.40E+01	Tier II (Suter & Tsao 1996)
Magnesium	7439-95-4	--	--	--	--	--	--	--	--	No ESV	No Source
Manganese	7439-96-5	--	--	--	--	120	Tier II (Suter & Tsao 1996)	--	--	1.20E+02	Tier II (Suter & Tsao 1996)
Mercury	7439-97-6	1.7	0.91	--	--	1.3	Tier II (Suter & Tsao 1996)	0.0013	--	9.10E-01	Ohio Administrative Code
Mercury (Diss)	7439-97-6	1.4	0.77	0.77	NAWQC 2009	--	--	--	--	7.70E-01	Ohio Administrative Code
Mercury, methyl	22967-92-6	--	--	--	--	0.0028	Tier II (Suter & Tsao 1996)	2.46E-03	--	2.80E-03	Tier II (Suter & Tsao 1996)

Table H-7. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio EPA Administrative Code (µg/L)[a]		Updated values for Suter and Tsao 1996[b]				USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)[c]		Preferred Surface Water Value[d]	
				NAWQC 2009 update		Tier II values					
		OMZM	OMZA	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
Molybdenum	7439-98-7	190,000	20,000	--	--	370	Tier II (Suter & Tsao 1996)	--	--	2.00E+05	Ohio Administrative Code
Nickel (Diss)	7440-02-0	470	52	52	NAWQC 2009	--	--	--	--	5.20E+01	Ohio Administrative Code
Nickel (TR)	7440-02-1	470	52	--	--	--	--	28.9	USEPA Reg 5	5.20E+01	Ohio Administrative Code
Potassium	7440-09-7	--	--	--	--	--	--	--	--	No ESV	No Source
Selenium (Diss)	7782-49-2	--	4.6	4.6	NAWQC 2009	--	--	--	--	4.60E+00	Ohio Administrative Code
Selenium	7782-49-2	--	5	5	NAWQC 2009	--	--	5	USEPA Reg 5	5.00E+00	Ohio Administrative Code
Silver (Diss)	7440-22-4	1.4	--	--	--	0.12	Tier II (Suter & Tsao 1996)	--	--	1.40E+00	Ohio Administrative Code
Silver	7440-22-4	1.6	1.3	--	--	0.36	Tier II (Suter & Tsao 1996)	0.12	USEPA Reg 5	1.30E+00	Ohio Administrative Code
Sodium	7440-23-5	--	--	--	--	--	--	--	--	No ESV	No Source
Strontium	7440-24-6	40,000	21,000	--	--	1,500	Tier II (Suter & Tsao 1996)	--	--	2.10E+04	Ohio Administrative Code
Thallium	7440-28-0	79	17	--	--	12	Tier II (Suter & Tsao 1996)	10	USEPA Reg 5	1.70E+01	Ohio Administrative Code
Tin	7440-31-5	1,600	180	--	--	73	Tier II (Suter & Tsao 1996)	180	USEPA Reg 5	1.80E+02	Ohio Administrative Code
Uranium	7440-61-1	--	--	--	--	2.6	Tier II (Suter & Tsao 1996)	--	--	2.60E+00	Tier II (Suter & Tsao 1996)
Vanadium	7440-62-2	150	44	--	--	20	Tier II (Suter & Tsao 1996)	12	USEPA Reg 5	4.40E+01	Ohio Administrative Code
Zinc (Diss)	7440-66-6	120	120	120	NAWQC 2009	--	--	--	--	1.20E+02	Ohio Administrative Code
Zinc (TR)	7440-66-6	120	120	--	--	--	--	65.7	USEPA Reg 5	1.20E+02	Ohio Administrative Code
Zirconium	7440-67-7	--	--	--	--	17	Tier II (Suter & Tsao 1996)	--	--	1.70E+01	Tier II (Suter & Tsao 1996)
Anions											
Chloride	16887-00-6	--	--	230,000	NAWQC 2009	--	--	--	--	2.30E+05	NAWQC 2009
Fluoride	16984-48-8	--	--	--	--	3400	Tier II (GLI database)	--	--	3.40E+03	Tier II (GLI database)
Hydrogen Sulfide/Sulfide	7783-06-4	--	--	2	NAWQC 2009	2	Tier II (GLI database)	--	--	2.00E+00	NAWQC 2009
Nitrate	14797-55-8	--	--	--	--	--	--	--	--	No ESV	No Source
Nitrite	14797-65-0	--	--	--	--	20	Tier II (GLI database)	--	--	2.00E+01	Tier II (GLI database)
Sulfite	14265-45-3	--	--	--	--	200	Tier II (GLI database)	--	--	2.00E+02	Tier II (GLI database)
Organic Chemicals											
Acenaphthene	83-32-9	19	15	--	--	5.3	Tier II (GLI database)	38	USEPA Reg 5	1.50E+01	Ohio Administrative Code
Acenaphthylene	208-96-8	120	13	--	--	--	--	4,840	USEPA Reg 5	1.30E+01	Ohio Administrative Code
Acetaldehyde	75-07-0	--	--	--	--	130	Tier II (GLI database)	--	--	1.30E+02	Tier II (GLI database)
Acetone	67-64-1	--	--	--	--	1500	Tier II (Suter & Tsao 1996)	1,700	USEPA Reg 5	1.50E+03	Tier II (Suter & Tsao 1996)
Acetonitrile	75-05-8	100,000	12,000	--	--	12,000	Tier II (GLI database)	12,000	USEPA Reg 5	1.20E+04	Ohio Administrative Code
Acetylaminofluorene[2-]	53-96-3	--	--	--	--	--	--	535	USEPA Reg 5	5.35E+02	USEPA Reg 5
Acrolein	107-02-8	--	--	3	NAWQC 2009	0.19	Tier II (GLI database)	0.19	USEPA Reg 5	3.00E+00	NAWQC 2009
Acrylonitrile	107-13-1	650	78	--	--	78	Tier II (GLI database)	66	USEPA Reg 5	7.80E+01	Ohio Administrative Code
Alachlor	15972-60-8	--	--	--	--	21	Tier II (GLI database)	--	--	2.10E+01	Tier II (GLI database)
Aldrin	309-00-2	--	--	--	--	0.035	Tier II (GLI database)	0.017	USEPA Reg 5	3.50E-02	Tier II (GLI database)
2-Amino-4,6-dinitrotoluene	35572-78-2	160	18	--	--	18	Tier II (GLI database)	--	--	1.80E+01	Ohio Administrative Code
4-Amino-2,6-dinitrotoluene	19406-51-0	98	11	--	--	11	Tier II (GLI database)	--	--	1.10E+01	Ohio Administrative Code
Aniline	62-53-3	30	4.1	--	--	4.1	Tier II (GLI database)	4.1	USEPA Reg 5	4.10E+00	Ohio Administrative Code
Anthracene	120-12-7	0.18	0.02	--	--	0.73	Tier II (Suter & Tsao 1996)	0.035	USEPA Reg 5	2.00E-02	Ohio Administrative Code
Aramite	140-57-8	--	--	--	--	--	--	3.09	USEPA Reg 5	3.09E+00	USEPA Reg 5
Azobenzene[p-(dimethylamino)]	60-11-7	--	--	--	--	--	--	1.65	USEPA Reg 5	1.65E+00	USEPA Reg 5
Benzene	71-43-2	700	160	--	--	130	Tier II (Suter & Tsao 1996)	114	USEPA Reg 5	1.60E+02	Ohio Administrative Code
Benzenemethanol	100-51-6	--	--	--	--	8.6	Tier II (Suter & Tsao 1996)	8.6	USEPA Reg 5	8.60E+00	Tier II (Suter & Tsao 1996)
Benzidine	92-87-5	--	--	--	--	3.9	Tier II (Suter & Tsao 1996)	--	--	3.90E+00	Tier II (Suter & Tsao 1996)
Benz(a)anthracene	56-55-3	42	4.7	--	--	0.027	Tier II (Suter & Tsao 1996)	0.025	USEPA Reg 5	4.70E+00	Ohio Administrative Code
Benzo(a)pyrene	50-32-8	0.54	0.06	--	--	0.014	Tier II (Suter & Tsao 1996)	0.014	USEPA Reg 5	6.00E-02	Ohio Administrative Code
Benzo(b)fluoranthene	205-99-2	23	2.6	--	--	2.6	Tier II (GLI database)	9.07	USEPA Reg 5	2.60E+00	Ohio Administrative Code
Benzo(g,h,i)perylene	191-24-2	--	--	--	--	--	--	7.64	USEPA Reg 5	7.64E+00	USEPA Reg 5
Benzo(k)fluoranthene	207-08-9	--	--	--	--	--	--	--	--	No ESV	No Source
Benzoic acid	65-85-0	--	--	--	--	42	Tier II (Suter & Tsao 1996)	--	--	4.20E+01	Tier II (Suter & Tsao 1996)

Table H-7. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio EPA Administrative Code (µg/L)[a]		Updated values for Suter and Tsao 1996[b]				USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)[c]		Preferred Surface Water Value[d]	
				NAWQC 2009 update		Tier II values					
		OMZM	OMZA	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
BHC, alpha	319-84-6	--	--	--	--	--	--	12.4	USEPA Reg 5	1.24E+01	USEPA Reg 5
BHC, beta	319-85-7	--	--	--	--	--	--	0.495	USEPA Reg 5	4.95E-01	USEPA Reg 5
BHC, delta	319-86-8	--	--	--	--	--	--	667	USEPA Reg 5	6.67E+02	USEPA Reg 5
BHC, gamma (Lindane)	58-89-9	0.95	0.057	--	--	0.057	Tier II (GLI database)	0.026	USEPA Reg 5	5.70E-02	Ohio Administrative Code
Biphenyl	92-52-4	26	6.5	--	--	6.5	Tier II (GLI database)	--	--	6.50E+00	Ohio Administrative Code
bis(2-Chloroethyl) ether	111-44-4	--	--	--	--	--	--	19,000	USEPA Reg 5	1.90E+04	USEPA Reg 5
bis(2-Ethylhexyl)phthalate	117-81-7	1,100	8.4	--	--	3.0	Tier II (Suter & Tsao 1996)	0.3	USEPA Reg 5	8.40E+00	Ohio Administrative Code
Bromodichloromethane	74-97-5	3,100	340	--	--	--	--	--	--	3.40E+02	Ohio Administrative Code
Bromomethane (methyl bromide)	74-83-9	38	16	--	--	16	Tier II (GLI database)	16	USEPA Reg 5	1.60E+01	Ohio Administrative Code
4-bromophenyl-phenylether	101-55-3	--	--	--	--	--	--	1.5	USEPA Reg 5	1.50E+00	USEPA Reg 5
2-Butanone (methyl ethyl ketone)	78-93-3	200,000	22,000	--	--	22,000	Tier II (GLI database)	2,200	USEPA Reg 5	2.20E+04	Ohio Administrative Code
Butyl benzyl phthalate	85-68-7	130	23	--	--	23	Tier II (GLI database)	23	USEPA Reg 5	2.30E+01	Ohio Administrative Code
Carbofuran	1563-66-2	--	--	--	--	1	Tier II (GLI database)	--	--	1.00E+00	Tier II (GLI database)
Carbon disulfide	75-15-0	130	15	--	--	15	Tier II (GLI database)	15	USEPA Reg 5	1.50E+01	Ohio Administrative Code
Carbon tetrachloride	56-23-5	2,200	240	--	--	240	Tier II (GLI database)	240	USEPA Reg 5	2.40E+02	Ohio Administrative Code
Chlordane	57-74-9	--	--	0.0043	NAWQC 2009	--	--	0.0043	USEPA Reg 5	4.30E-03	NAWQC 2009
gamma-Chlordane	5103-74-2	--	--	--	--	--	--	--	--	No ESV	No Source
4-Chloroaniline	106-47-8	--	--	--	--	--	--	232	USEPA Reg 5	2.32E+02	USEPA Reg 5
Chlorobenzene	108-90-7	420	47	--	--	47	Tier II (GLI database)	47	USEPA Reg 5	4.70E+01	Ohio Administrative Code
Chlorobenzilate	510-15-6	--	--	--	--	--	--	7.16	USEPA Reg 5	7.16E+00	USEPA Reg 5
Chloroform	67-66-3	1,300	140	--	--	140	Tier II (GLI database)	140	USEPA Reg 5	1.40E+02	Ohio Administrative Code
Chloromethane	74-87-3	--	--	--	--	--	--	--	--	No ESV	No Source
2-Chloronaphthalene	91-58-7	--	--	--	--	--	--	0.396	USEPA Reg 5	3.96E-01	USEPA Reg 5
2-Chlorophenol	95-57-8	290	32	--	--	32	Tier II (GLI database)	24	USEPA Reg 5	3.20E+01	Ohio Administrative Code
Chloropyrifos	2921-88-2	--	--	0.041	NAWQC 2009	--	--	--	--	4.10E-02	NAWQC 2009
4-chloro-3-methylphenol	59-50-7	--	--	--	--	--	--	34.8	USEPA Reg 5	3.48E+01	USEPA Reg 5
Chrysene	218-01-9	42	4.7	--	--	--	--	--	--	4.70E+00	Ohio Administrative Code
Cyanazine	21725-46-2	--	--	--	--	270	Tier II (GLI database)	--	--	2.70E+02	Tier II (GLI database)
2,4-D	94-75-7	--	--	--	--	240	Tier II (GLI database)	220	USEPA Reg 5	2.40E+02	Tier II (GLI database)
4,4'-DDD	72-54-8	--	--	--	--	--	--	--	--	No ESV	No Source
4,4'-DDE	72-55-9	--	--	--	--	--	--	4.51E-09	USEPA Reg 5	4.51E-09	USEPA Reg 5
4,4'-DDT	50-29-3	1.10E-05	1.10E-05	0.001	NAWQC 2009	--	--	1.10E-05	USEPA Reg 5	1.10E+01	Ohio Administrative Code
Demeton	8065-48-3	--	--	0.1	NAWQC 2009	0.1	Tier II (GLI database)	--	--	1.00E-01	NAWQC 2009
Diazinon	333-41-5	--	--	0.17	NAWQC 2009	0.08	Tier II (GLI database)	--	--	1.70E-01	NAWQC 2009
Dibenzofuran	132-64-9	36	4	--	--	4	Tier II (GLI database)	4	USEPA Reg 5	4.00E+00	Ohio Administrative Code
Dibromochloromethane	124-48-1	2,900	320	--	--	--	--	--	--	3.20E+02	Ohio Administrative Code
2,2-Dibromo-3-nitrilopropionamide	10222-01-2	--	--	--	--	20	Tier II (GLI database)	--	--	2.00E+01	Tier II (GLI database)
1,2-Dichlorobenzene	95-50-1	130	23	--	--	23	Tier II (GLI database)	14	USEPA Reg 5	2.30E+01	Ohio Administrative Code
1,3-Dichlorobenzene	541-73-1	79	22	--	--	22	Tier II (GLI database)	38	USEPA Reg 5	2.20E+01	Ohio Administrative Code
1,4-Dichlorobenzene	106-46-7	57	9.4	--	--	9.4	Tier II (GLI database)	9.4	USEPA Reg 5	9.40E+00	Ohio Administrative Code
Dichlorobenzene	25321-22-6	--	--	--	--	5	Tier II (GLI database)	--	--	5.00E+00	Tier II (GLI database)
3,3'-Dichlorobenzidine	91-94-1	--	--	--	--	--	--	4.5	USEPA Reg 5	4.50E+00	USEPA Reg 5
1,1-Dichloroethane	75-34-3	3,700	410	--	--	740	Tier II (GLI database)	47	USEPA Reg 5	4.10E+02	Ohio Administrative Code
1,2-Dichloroethane	107-06-2	9,600	2,000	--	--	2,000	Tier II (GLI database)	910	USEPA Reg 5	2.00E+03	Ohio Administrative Code
1,1-Dichloroethene	75-35-4	1,900	210	--	--	210	Tier II (GLI database)	65	USEPA Reg 5	2.10E+02	Ohio Administrative Code
1,2-Dichloroethene	540-59-0	8,800	970	--	--	970	Tier II (GLI database)	970	USEPA Reg 5	9.70E+02	Ohio Administrative Code
2,4-Dichlorophenol	120-83-2	110	11	--	--	11	Tier II (GLI database)	11	USEPA Reg 5	1.10E+01	Ohio Administrative Code
1,2-Dichloropropane	78-87-5	3,300	520	--	--	520	Tier II (GLI database)	360	USEPA Reg 5	5.20E+02	Ohio Administrative Code
1,3-Dichloropropene	542-75-6	15	1.7	--	--	1.7	Tier II (GLI database)	--	--	1.70E+00	Ohio Administrative Code
Dieldrin	60-57-1	0.24	0.056	0.056	NAWQC 2009	--	--	7.10E-05	USEPA Reg 5	5.60E-02	Ohio Administrative Code
Diethylphthalate	84-66-2	980	220	--	--	220	Tier II (GLI database)	110	USEPA Reg 5	2.20E+02	Ohio Administrative Code

Table H-7. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio EPA Administrative Code (µg/L)[a]		Updated values for Suter and Tsao 1996[b]				USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)[c]		Preferred Surface Water Value[d]	
				NAWQC 2009 update		Tier II values					
		OMZM	OMZA	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
7,12'-Dimethylbenz(a)anthracene	57-97-6	--	--	--	--	--	--	0.548	USEPA Reg 5	5.48E-01	USEPA Reg 5
2,4-Dimethylphenol	105-67-9	140	15	--	--	15	Tier II (GLI database)	100	USEPA Reg 5	1.50E+01	Ohio Administrative Code
Dimethylphthalate	131-11-3	3,200	1,100	--	--	1100	Tier II (GLI database)	--	--	1.10E+03	Ohio Administrative Code
Di-n-butyl phthalate	84-74-2	--	--	--	--	19	Tier II (GLI database)	9.7	USEPA Reg 5	1.90E+01	Tier II (GLI database)
Di-n-octylphthalate	117-84-0	--	--	--	--	--	--	30	USEPA Reg 5	3.00E+01	USEPA Reg 5
3,5-Dinitroaniline	618-87-1	210	70	--	--	70	Tier II (GLI database)	--	--	7.00E+01	Ohio Administrative Code
1,3-Dinitrobenzene	99-65-0	100	22	--	--	22	Tier II (GLI database)	22	--	2.20E+01	Ohio Administrative Code
2,4-Dinitrophenol	51-28-5	--	--	--	--	--	--	19	USEPA Reg 5	1.90E+01	USEPA Reg 5
2,3-Dinitrotoluene	602-01-7	21	2.3	--	--	2.3	Tier II (GLI database)	--	--	2.30E+00	Ohio Administrative Code
2,4-Dinitrotoluene	121-14-2	390	44	--	--	44	Tier II (GLI database)	44	USEPA Reg 5	4.40E+01	Ohio Administrative Code
2,5-Dinitrotoluene	619-15-8	50	5.6	--	--	5.6	Tier II (GLI database)	--	--	5.60E+00	Ohio Administrative Code
2,6-Dinitrotoluene	606-20-2	730	81	--	--	81	Tier II (GLI database)	81	USEPA Reg 5	8.10E+01	Ohio Administrative Code
3,5-Dinitrotoluene	618-85-9	860	95	--	--	95	Tier II (GLI database)	--	--	9.50E+01	Ohio Administrative Code
4,6-Dinitro-2-methylphenol	534-52-1	--	--	--	--	--	--	23	USEPA Reg 5	2.30E+01	USEPA Reg 5
Dinoseb	88-85-7	--	--	--	--	--	--	0.48	USEPA Reg 5	4.80E-01	USEPA Reg 5
1,4-Dioxane	123-91-1	--	--	--	--	--	--	22,000	USEPA Reg 5	2.20E+04	USEPA Reg 5
Diphenylamine	122-39-4	--	--	--	--	--	--	412	USEPA Reg 5	4.12E+02	USEPA Reg 5
1,2-Diphenylhydrazine	122-66-7	--	--	--	--	1.1	Tier II (GLI database)	--	--	1.10E+00	Tier II (GLI database)
Disulfoton	298-04-4	--	--	--	--	--	--	0.0402	USEPA Reg 5	4.02E-02	USEPA Reg 5
Endosulfan	115-29-7	--	--	--	--	0.009	Tier II (GLI database)	--	--	9.00E-03	Tier II (GLI database)
Endosulfan I (alpha)	959-98-8	--	--	0.056	NAWQC 2009	--	--	0.056	USEPA Reg 5	5.60E-02	NAWQC 2009
Endosulfan II (beta)	33213-65-9	--	--	0.056	NAWQC 2009	--	--	0.056	USEPA Reg 5	5.60E-02	NAWQC 2009
Endosulfan sulfate	1031-07-8	--	--	--	--	--	--	2.22	USEPA Reg 5	2.22E+00	USEPA Reg 5
Endrin	72-20-8	0.086	0.036	0.036	NAWQC 2009	--	--	0.036	USEPA Reg 5	3.60E-02	Ohio Administrative Code
Endrin Aldehyde	7421-93-4	--	--	--	--	--	--	0.15	USEPA Reg 5	1.50E-01	USEPA Reg 5
Ethylbenzene	100-41-4	550	61	--	--	61	Tier II (GLI database)	14	USEPA Reg 5	6.10E+01	Ohio Administrative Code
Ethylene glycol	107-21-1	1,300,000	140,000	--	--	140000	Tier II (GLI database)	--	--	1.40E+05	Ohio Administrative Code
Fluoranthene	206-44-0	3.7	0.80	6.16	NAWQC (Suter & Tsao 1996)	0.8	Tier II (GLI database)	1.9	USEPA Reg 5	8.00E-01	Ohio Administrative Code
Fluorene	86-73-7	110	19	--	--	19	Tier II (GLI database)	19	USEPA Reg 5	1.90E+01	Ohio Administrative Code
Formaldehyde	50-00-0	--	--	--	--	74	Tier II (GLI database)	--	--	7.40E+01	Tier II (GLI database)
Guthion	86-50-0	--	--	0.01	NAWQC 2009	0.005	Tier II (GLI database)	--	--	1.00E-02	NAWQC 2009
Heptachlor	76-44-8	--	--	0.0038	NAWQC 2009	--	--	3.80E-03	USEPA Reg 5	3.80E-03	NAWQC 2009
Heptachlor Epoxide	1024-57-3	--	--	0.0038	NAWQC 2009	--	--	3.80E-03	USEPA Reg 5	3.80E-03	NAWQC 2009
Hexachlorobenzene	118-74-1	--	--	--	--	--	--	3.00E-04	USEPA Reg 5	3.00E-04	USEPA Reg 5
Hexachlorobutadiene	87-68-3	--	--	--	--	1	Tier II (GLI database)	0.053	USEPA Reg 5	1.00E+00	Tier II (GLI database)
Hexachlorocyclopentadiene	77-47-4	--	--	--	--	0.45	Tier II (GLI database)	77	USEPA Reg 5	4.50E-01	Tier II (GLI database)
Hexachloroethane	67-72-1	--	--	--	--	--	--	8	USEPA Reg 5	8.00E+00	USEPA Reg 5
Hexachorophene	70-30-4	--	--	--	--	--	--	0.228	USEPA Reg 5	2.28E-01	USEPA Reg 5
2-Hexanone	591-78-6	--	--	--	--	--	--	99	USEPA Reg 5	9.90E+01	USEPA Reg 5
HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)	2691-41-0	1,200	220	--	--	220	Tier II (GLI database)	--	--	2.20E+02	Ohio Administrative Code
Hydroquinone	123-31-9	--	--	--	--	2.2	Tier II (GLI database)	--	--	2.20E+00	Tier II (GLI database)
Indeno(1,2,3-cd)pyrene	193-39-5	--	--	--	--	--	--	4.31	USEPA Reg 5	4.31E+00	USEPA Reg 5
Isodecyl diphenyl phosphate	29761-21-5	--	--	--	--	1.73	Tier II (GLI database)	--	--	1.73E+00	Tier II (GLI database)
Isodrin	465-73-6	--	--	--	--	--	--	0.0309	USEPA Reg 5	3.09E-02	USEPA Reg 5
Isophorone	78-59-1	7,500	920	--	--	920	Tier II (GLI database)	920	USEPA Reg 5	9.20E+02	Ohio Administrative Code
Isopropylbenzene	98-82-8	43	4.8	--	--	4.8	Tier II (GLI database)	--	--	4.80E+00	Ohio Administrative Code
4-Isopropyltoluene	99-87-6	150	16	--	--	16	Tier II (GLI database)	--	--	1.60E+01	Ohio Administrative Code
Kepone	143-50-0	--	--	--	--	--	--	0.132	USEPA Reg 5	1.32E-01	USEPA Reg 5
Malathion	121-75-5	--	--	0.1	NAWQC 2009	0.1	Tier II (GLI database)	--	--	1.00E-01	NAWQC 2009

Table H-7. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio EPA Administrative Code (µg/L)[a]		Updated values for Suter and Tsao 1996[b]				USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)[c]		Preferred Surface Water Value[d]	
				NAWQC 2009 update		Tier II values					
		OMZM	OMZA	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
MBAS (foaming agents, aesthetic criteria)	--	500	--	--	--	--	--	--	--	5.00E+02	Ohio Administrative Code
Methanol	67-56-1	--	--	--	--	330	Tier II (GLI database)	--	--	3.30E+02	Tier II (GLI database)
Methoxychlor	72-43-5	--	--	0.03	NAWQC 2009	0.03	Tier II (GLI database)	0.019	USEPA Reg 5	3.00E-02	NAWQC 2009
Methyl methacrylate	80-62-6	--	--	--	--	--	--	2,800	USEPA Reg 5	2.80E+03	USEPA Reg 5
4-Methyl-2-pentanone	108-10-1	--	--	--	--	--	--	170	USEPA Reg 5	1.70E+02	USEPA Reg 5
Methyl tert-butyl ether	1634-04-4	6,500	730	51,000	NAWQC 2009	730	Tier II (GLI database)	--	--	7.30E+02	Ohio Administrative Code
Methylamine	74-89-5	--	--	--	--	860	Tier II (GLI database)	--	--	8.60E+02	Tier II (GLI database)
3-Methylcholanthrene	56-49-5	--	--	--	--	--	--	0.0891	USEPA Reg 5	8.91E-02	USEPA Reg 5
Methylene Chloride (dichloromethane)	75-09-2	11,000	1,900	--	--	2,200	Tier II (Suter & Tsao 1996)	940	USEPA Reg 5	1.90E+03	Ohio Administrative Code
Methylene dithiocyanate	6317-18-6	--	--	--	--	1	Tier II (GLI database)	--	--	1.00E+00	Tier II (GLI database)
2-Methylnaphthalene	91-57-6	--	--	--	--	4.7	Tier II (GLI database)	330	USEPA Reg 5	4.70E+00	Tier II (GLI database)
2-Methylphenol	95-48-7	600	67	--	--	67	Tier II (GLI database)	67	USEPA Reg 5	6.70E+01	Ohio Administrative Code
3-Methylphenol	108-39-4	560	62	--	--	62	Tier II (GLI database)	62	USEPA Reg 5	6.20E+01	Ohio Administrative Code
4-Methylphenol	106-44-5	480	53	--	--	53	Tier II (GLI database)	25	USEPA Reg 5	5.30E+01	Ohio Administrative Code
Mirex	2385-85-5	--	--	0.001	NAWQC 2009	0.001	Tier II (GLI database)	--	--	1.00E-03	NAWQC 2009
Naphthalene	91-20-3	170	21	--	--	21	Tier II (GLI database)	13	USEPA Reg 5	2.10E+01	Ohio Administrative Code
Nitrilotriacetic acid	139-13-9	--	--	--	--	5000	Tier II (GLI database)	--	--	5.00E+03	Tier II (GLI database)
Nitrobenzene	99-95-3	2,000	380	--	--	380	Tier II (GLI database)	220	USEPA Reg 5	3.80E+02	Ohio Administrative Code
Nitroglycerin	55-63-0	160	18	--	--	18	Tier II (GLI database)	--	--	1.80E+01	Ohio Administrative Code
2-Nitrophenol	88-75-5	650	73	--	--	73	Tier II (GLI database)	--	--	7.30E+01	Ohio Administrative Code
4-Nitrophenol	100-02-7	--	--	--	--	58	Tier II (GLI database)	60	USEPA Reg 5	5.80E+01	Tier II (GLI database)
N-Nitrosodiethylamine	55-18-5	--	--	--	--	--	--	768	USEPA Reg 5	7.68E+02	USEPA Reg 5
N-Nitrosodiphenylamine	86-30-6	--	--	--	--	25	Tier II (GLI database)	--	--	2.50E+01	Tier II (GLI database)
2-Nitrotoluene	88-72-2	640	71	--	--	71	Tier II (GLI database)	--	--	7.10E+01	Ohio Administrative Code
3-Nitrotoluene	99-08-1	380	42	--	--	42	Tier II (GLI database)	--	--	4.20E+01	Ohio Administrative Code
4-Nitrotoluene	99-99-0	410	46	--	--	46	Tier II (GLI database)	--	--	4.60E+01	Ohio Administrative Code
Nonylphenol	84852-15-3	--	--	28	NAWQC 2009	--	--	--	--	2.80E+01	NAWQC 2009
Oil & Grease (aesthetic criteria)	--	10,000	--	--	--	--	--	--	--	1.00E+04	Ohio Administrative Code
Parathion	56-38-2	0.065	0.013	0.013	NAWQC 2009	--	--	0.013	USEPA Reg 5	1.30E-02	Ohio Administrative Code
PCDDs	PCDD-S	--	--	--	--	--	--	2.78E-07	USEPA Reg 5	2.78E-07	USEPA Reg 5
Pentachlorobenzene	608-93-5	--	--	--	--	3.1	Tier II (GLI database)	0.019	USEPA Reg 5	3.10E+00	Tier II (GLI database)
Pentachloroethane	76-01-7	--	--	--	--	--	--	56.4	USEPA Reg 5	5.64E+01	USEPA Reg 5
Pentachlorophenol	87-86-5	5.3	4	15	NAWQC 2009	--	--	4	USEPA Reg 5	4.00E+00	Ohio Administrative Code
Perchlorate	14797-73-0	20,000	10,000	--	--	--	--	--	--	1.00E+04	Ohio Administrative Code
Phenanthrene	85-01-8	31	2.3	--	--	2.3	Tier II (GLI database)	3.6	USEPA Reg 5	2.30E+00	Ohio Administrative Code
Phenol	108-95-2	4,700	400	--	--	400	Tier II (GLI database)	180	USEPA Reg 5	4.00E+02	Ohio Administrative Code
Phenol (cold water and salmon spawning habitat)	108-95-2	4,600	160	--	--	--	--	--	--	1.60E+02	Ohio Administrative Code
Phorate	298-02-2	--	--	--	--	--	--	3.62	USEPA Reg 5	3.62E+00	USEPA Reg 5
Polychlorinated biphenyls	1336-36-3	1.20E-04	1.20E-04	0.014	NAWQC 2009	--	--	1.20E-04	USEPA Reg 5	1.20E-04	Ohio Administrative Code
Propylene glycol	57-55-6	640,000	71,000	--	--	71000	Tier II (GLI database)	--	--	7.10E+04	Ohio Administrative Code
Pyrene	129-00-0	42	4.6	--	--	4.6	Tier II (GLI database)	0.3	USEPA Reg 5	4.60E+00	Ohio Administrative Code
Pyridine	110-86-1	--	--	--	--	--	--	2,380	USEPA Reg 5	2.38E+03	USEPA Reg 5

Table H-7. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio EPA Administrative Code (µg/L)[a]		Updated values for Suter and Tsao 1996[b]				USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)[c]		Preferred Surface Water Value[d]	
				NAWQC 2009 update		Tier II values					
		OMZM	OMZA	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)	121-82-4	520	79	--	--	79	Tier II (GLI database)	--	--	7.90E+01	Ohio Administrative Code
SAS-310	--	5	0.61	--	--	0.61	Tier II (GLI database)	--	--	6.10E-01	Ohio Administrative Code
Silvex (2,4,5-TP)	93-72-1	--	--	--	--	--	--	30	USEPA Reg 5	3.00E+01	USEPA Reg 5
Simazine	122-34-9	--	--	--	--	9	Tier II (GLI database)	--	--	9.00E+00	Tier II (GLI database)
Styrene	100-42-5	290	32	--	--	32	Tier II (GLI database)	32	USEPA Reg 5	3.20E+01	Ohio Administrative Code
1,2,4,5-Tetrachlorobenzene	95-94-3	--	--	--	--	8.3	Tier II (GLI database)	3	USEPA Reg 5	8.30E+00	Tier II (GLI database)
2,3,7,8-Tetrachlorodibenzo -p-dioxin (TCDD)	1746-01-6	--	--	--	--	--	--	3.00E-09	USEPA Reg 5	3.00E-09	USEPA Reg 5
1,1,1,2-Tetrachloroethane	630-20-6	770	85	--	--	85	Tier II (GLI database)	--	--	8.50E+01	Ohio Administrative Code
1,1,2,2-Tetrachloroethane	79-34-5	910	260	--	--	260	Tier II (GLI database)	380	USEPA Reg 5	2.60E+02	Ohio Administrative Code
Tetrachloroethene	127-18-4	430	53	--	--	53	Tier II (GLI database)	45	USEPA Reg 5	5.30E+01	Ohio Administrative Code
2,3,4,6-Tetrachlorophenol	58-90-2	--	--	--	--	--	--	1.2	USEPA Reg 5	1.20E+00	USEPA Reg 5
Tetraethyl dithiopyrophosphate	3689-24-5	--	--	--	--	--	--	13.9	USEPA Reg 5	1.39E+01	USEPA Reg 5
Tetrahydrofuran	109-99-9	74,000	11,000	--	--	11,000	Tier II (GLI database)	--	--	1.10E+04	Ohio Administrative Code
Tetryl	479-45-8	--	--	--	--	--	--	--	--	No ESV	No Source
Toluene	108-88-3	560	62	--	--	62	Tier II (GLI database)	253	USEPA Reg 5	6.20E+01	Ohio Administrative Code
Toxaphene	8001-35-2	--	--	0.0002	NAWQC 2009	0.005	Tier II (GLI database)	1.40E-04	USEPA Reg 5	2.00E-04	NAWQC 2009
Tribromomethane (Bromoform)	75-25-2	1,100	230	--	--	230	Tier II (GLI database)	230	USEPA Reg 5	2.30E+02	Ohio Administrative Code
2,4,6-Tribromophenol	118-79-6	50	5.6	--	--	5.6	Tier II (GLI database)	--	--	5.60E+00	Ohio Administrative Code
Tributyltin (TBT)	688-73-3	--	--	0.072	NAWQC 2009	--	--	--	--	7.20E-02	NAWQC 2009
Trichlorobenzene	12002-48-1	--	--	--	--	5	Tier II (GLI database)	--	--	5.00E+00	Tier II (GLI database)
1,2,4-Trichlorobenzene	120-82-1	--	--	--	--	--	--	30	USEPA Reg 5	3.00E+01	USEPA Reg 5
1,1,1-Trichloroethane	71-55-6	690	76	--	--	76	Tier II (GLI database)	76	USEPA Reg 5	7.60E+01	Ohio Administrative Code
1,1,2-Trichloroethane	79-00-5	3,300	740	--	--	740	Tier II (GLI database)	500	USEPA Reg 5	7.40E+02	Ohio Administrative Code
Trichloroethylene	79-01-6	2,000	220	--	--	220	Tier II (GLI database)	47	USEPA Reg 5	2.20E+02	Ohio Administrative Code
2,4,5-Trichlorophenol	95-95-4	--	--	--	--	1.9	Tier II (GLI database)	--	--	1.90E+00	Tier II (GLI database)
2,4,6-Trichlorophenol	88-06-2	39	4.9	--	--	4.9	Tier II (GLI database)	4.9	USEPA Reg 5	4.90E+00	Ohio Administrative Code
2,4,5-Trichlorophenoxyacetic acid	93-76-5	--	--	--	--	--	--	686	USEPA Reg 5	6.86E+02	USEPA Reg 5
O,O,O-Triethyl phosphorothioate	126-68-1	--	--	--	--	--	--	58.2	USEPA Reg 5	5.82E+01	USEPA Reg 5
Trimethylbenzene	25551-13-7	--	--	--	--	15	Tier II (GLI database)	--	--	1.50E+01	Tier II (GLI database)
1,2,4-Trimethylbenzene	95-63-6	140	15	--	--	15	Tier II (GLI database)	--	--	1.50E+01	Ohio Administrative Code
1,3,5-Trimethylbenzene	108-67-8	230	26	--	--	26	Tier II (GLI database)	--	--	2.60E+01	Ohio Administrative Code
1,3,5-Trinitrobenzene	99-35-4	27	11	--	--	11	Tier II (GLI database)	--	--	1.10E+01	Ohio Administrative Code
2,4,6-Trinitrotoluene	118-96-7	120	13	--	--	13	Tier II (GLI database)	--	--	1.30E+01	Ohio Administrative Code
Triphenyl phosphate	115-86-6	--	--	--	--	4	Tier II (GLI database)	--	--	4.00E+00	Tier II (GLI database)
Urea	57-13-6	150,000	17,000	--	--	17,000	Tier II (GLI database)	--	--	1.70E+04	Ohio Administrative Code

Table H-7. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio EPA Administrative Code (µg/L)[a]		Updated values for Suter and Tsao 1996[b]				USEPA Region 5 Ecological Screening Levels (2003) (update of 1998 EDQLs)[c]		Preferred Surface Water Value[d]	
				NAWQC 2009 update		Tier II values					
		OMZM	OMZA	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
Vinyl acetate	108-05-4	--	--	--	--	--	--	248	USEPA Reg 5	2.48E+02	USEPA Reg 5
Vinyl chloride	75-01-4	8,400	930	--	--	930	Tier II (GLI database)	930	USEPA Reg 5	9.30E+02	Ohio Administrative Code
Xylenes (total)	1330-20-7	240	27	--	--	27	Tier II (GLI database)	27	USEPA Reg 5	2.70E+01	Ohio Administrative Code

[a] Ohio EPA, Division of Surface Water. 1999. Ohio Administrative Code, Chapters 3745-1, 3745-2, May 11 (Ohio River Basin). Where Ohio River Basin is unavailable, Lake Erie is used (acentaphthylene, benz(a)anthracene, bezo(a)pyrene, benzo(b)fluoranthene, bromodichloromethane, chrysene, dibromochloromethane, and 1,1-dichloroethane). Lake Erie Wildlife OMZA (Table 33-2) used for polychlorinated biphenyls and 4,4'-DDT. Pentachlorophenol is pH dependent; 6.5 used as default pH. Ammonia is both pH and temperature dependent; default value is the lowest available for each criteria. The following metals are hardness dependent: beryllium, cadmium, chromium, copper, lead, nickel, and silver; 100mg/L $CaCO_3$ used as default hardness.

[b] Suter, G. W. and C.L. Tsao, *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision*, ES/ER/TM-96/R2 Lockheed Martin Energy Systems, Oak Ridge National Laboratory. See notes below for NAWQC and GLI.

[c] United States Environmental Protection Agency (USEPA) 2003. Ecological Screening Levels (ESLs). Formerly Ecological Data Quality Levels (EDQLs). http://www.epa.gov/reg5rcra/ca/edql.htm

[d] The preferred surface water value is the hierarchy of Chapters 3745-1 and 3745-2 of the Ohio Administrative Code for the Ohio River Basin (1999), Suter and Tsao 1996 (NAWQC followed by Tier II), and EDQLs from USEPA Region 5 (USEPA 2003). For comparisons of average concentrations to ESVs, the OMZA is the preferred value. Even in the absence of average concentrations, the OMZA remains the preferred value. In the absence of either OMZM or OMZA values, the next available value from the hierarchy [Suter and Tsao 1996 (NAWQC followed by Tier II) and then EDQLs from Region 5 (USEPA 2003)] was used in the comparison.

-- = no value

CAS = Chemical Abstract Service

Diss = Dissolved

GLI = Great Lakes Initiative Clearinghouse database, contains Tier II secondary chronic values; http://epa.gov/gliclear/. Values used as supplement to original Suter and Tsao values because of scholarship and methodology shown in Suter and Tsao.

ID = Insufficient data available to calculate criterion

Ohio EPA Tier II values used where available; otherwise lowest or most recent value, as appropriate.

NAWQC = National Ambient Water Quality Criteria, originally found in Suter and Tsao 1996 and updated 2009 as National Recommended Water Quality Criteria; values are freshwater chronic. http://epa.gov/waterscience/criteria/wqctable/

NAWQC 2009 value for copper can be found at http://www.epa.gov/waterscience/criteria/copper/2007/criteria-full.pdf

NAWQC 2009 value for methyl tert-butyl ether can be found at http://www.epa.gov/waterscience/criteria/mtbe/#findings

OMZA = Outside Mixing Zone Average.

OMZM = Outside Mixing Zone Maximum

Table H-8. SRC and Integrated COPEC Screening with Maximum Ratio for Shallow Surface Soil (0-1 ft bgs ISM Samples) at Load Line 5

Analyte (mg/kg)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Inorganic Chemicals														
Aluminum	**7429-90-5**	**60/ 60**	**7090**	**18000**	**10500**	**17700**	**No**	**Yes**	**Exceeds background**	**50**	**PRGs**	**Yes**	**Exceeds background**	**360**
Antimony	7440-36-0	18/ 59	0.1	0.46	1.62	0.96	No	No	Below background	0.27	EcoSSL	No	Below background	1.70
Arsenic	7440-38-2	60/ 60	4.3	14	10.3	15.4	No	No	Below background	18	EcoSSL	No	Below background	0.78
Barium	7440-39-3	60/ 60	36.8	220	69.5	88.4	No	Yes	Exceeds background	330	EcoSSL	No	Below ESV	0.67
Beryllium	7440-41-7	45/ 60	0.48	4.2	0.716	0.88	No	Yes	Exceeds background	21	EcoSSL	No	Below ESV	0.20
Cadmium	**7440-43-9**	**41/ 60**	**0.08**	**3**	**0.509**	**0**	**No**	**Yes**	**Exceeds background**	**0.36**	**EcoSSL**	**Yes**	**Exceeds ESV**	**8.33**
Calcium	7440-70-2	60/ 60	840	140000	11400	15800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	**7440-47-3**	**60/ 60**	**13.3**	**86.7**	**23**	**17.4**	**No**	**Yes**	**Exceeds background**	**26**	**EcoSSL**	**Yes**	**Exceeds ESV**	**3.33**
Cobalt	**7440-48-4**	**60/ 60**	**1.9**	**13.3**	**7.83**	**10.4**	**No**	**Yes**	**Exceeds background**	**13**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.02**
Copper	**7440-50-8**	**60/ 60**	**9.1**	**49**	**17.5**	**17.7**	**No**	**Yes**	**Exceeds background**	**28**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.75**
Iron	7439-89-6	60/ 60	11000	26000	20500	23100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	**7439-92-1**	**60/ 60**	**15.6**	**170**	**38.6**	**26.1**	**No**	**Yes**	**Exceeds background**	**11**	**EcoSSL**	**Yes**	**Exceeds ESV**	**15.45**
Magnesium	7439-95-4	60/ 60	1500	16000	3060	3030	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**60/ 60**	**240**	**3100**	**576**	**1450**	**No**	**Yes**	**Exceeds background**	**220**	**EcoSSL**	**Yes**	**Exceeds ESV**	**14.09**
Mercury	**7439-97-6**	**48/ 60**	**0.018**	**3**	**0.15**	**0.036**	**Yes**	**Yes**	**Exceeds background, PBT Compound**	**0.00051**	**PRGs**	**Yes**	**Exceeds ESV, PBT Compound**	**5882.35**
Nickel	7440-02-0	60/ 60	12	33	21.1	21.1	No	Yes	Exceeds background	38	EcoSSL	No	Below ESV	0.87
Potassium	7440-09-7	51/ 60	636	2100	945	927	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	**7782-49-2**	**41/ 60**	**0.47**	**1.8**	**0.697**	**1.4**	**No**	**Yes**	**Exceeds background**	**0.52**	**EcoSSL**	**Yes**	**Exceeds ESV**	**3.46**
Silver	7440-22-4	1/ 60	0.022	0.022	0.49	0	No	Yes	Exceeds background	4.2	EcoSSL	No	Below ESV	0.01
Sodium	7440-23-5	45/ 60	29.8	970	176	123	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	21/ 60	0.11	0.28	0.427	0	No	Yes	Exceeds background	1	PRGs	No	Below ESV	0.28
Vanadium	7440-62-2	60/ 60	11	25	18.2	31.1	No	No	Below background	7.8	EcoSSL	No	Below background	3.21
Zinc	**7440-66-6**	**60/ 60**	**40.3**	**140**	**76.1**	**61.8**	**No**	**Yes**	**Exceeds background**	**46**	**EcoSSL**	**Yes**	**Exceeds ESV**	**3.04**
Anions														
Nitrate	**14797-55-8**	**18/ 29**	**0.38**	**32**	**2.01**	**0**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Explosives														
4-Nitrotoluene	**99-99-0**	**1/ 60**	**0.07**	**0.07**	**0.144**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
HMX	**2691-41-0**	**1/ 60**	**0.012**	**0.012**	**0.11**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Nitrocellulose	**9004-70-0**	**4/ 8**	**1.4**	**3.1**	**1.68**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Tetryl	**479-45-8**	**1/ 60**	**0.017**	**0.017**	**0.158**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds														
2-Methylnaphthalene	91-57-6	5/ 9	0.016	0.11	0.145	0	No	Yes	Detected organic	3.24	USEPA Reg 5	No	Below ESV	0.03
Acenaphthene	83-32-9	4/ 22	0.018	0.038	0.0592	0	No	Yes	Detected organic	20	PRGs	No	Below ESV	0.002
Acenaphthylene	208-96-8	1/ 22	0.016	0.016	0.0583	0	No	Yes	Detected organic	682	USEPA Reg 5	No	Below ESV	2.35E-05
Anthracene	120-12-7	7/ 22	0.0092	0.16	0.0742	0	No	Yes	Detected organic	1480	USEPA Reg 5	No	Below ESV	1.08E-04
Benz(a)anthracene	56-55-3	19/ 22	0.0098	1.4	0.182	0	No	Yes	Detected organic	5.21	USEPA Reg 5	No	Below ESV	0.27
Benzenemethanol	100-51-6	2/ 6	0.46	1.3	0.543	0	No	Yes	Detected organic	65.8	USEPA Reg 5	No	Below ESV	0.02
Benzo(a)pyrene	50-32-8	18/ 22	0.0089	0.53	0.126	0	No	Yes	Detected organic	1.52	USEPA Reg 5	No	Below ESV	0.35
Benzo(b)fluoranthene	205-99-2	19/ 22	0.016	0.78	0.162	0	No	Yes	Detected organic	59.8	USEPA Reg 5	No	Below ESV	0.01
Benzo(ghi)perylene	191-24-2	16/ 22	0.0094	0.28	0.0954	0	No	Yes	Detected organic	119	USEPA Reg 5	No	Below ESV	0.002
Benzo(k)fluoranthene	207-08-9	15/ 22	0.0099	0.4	0.104	0	No	Yes	Detected organic	148	USEPA Reg 5	No	Below ESV	0.003
Bis(2-ethylhexyl)phthalate	117-81-7	2/ 9	0.12	0.13	0.183	0	No	Yes	Detected organic	0.925	USEPA Reg 5	No	Below ESV	0.14
Carbazole	**86-74-8**	**2/ 9**	**0.017**	**0.038**	**0.143**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Chrysene	218-01-9	20/ 22	0.012	1.4	0.19	0	No	Yes	Detected organic	4.73	USEPA Reg 5	No	Below ESV	0.30
Di-n-butyl phthalate	84-74-2	1/ 9	0.022	0.022	0.249	0	No	Yes	Detected organic	200	PRGs	No	Below ESV	1.10E-04
Dibenz(a,h)anthracene	53-70-3	5/ 22	0.013	0.092	0.0648	0	No	Yes	Detected organic	18.4	USEPA Reg 5	No	Below ESV	0.01

Table H-8. SRC and Integrated COPEC Screening with Maximum Ratio for Shallow Surface Soil (0-1 ft bgs ISM Samples) at Load Line 5 (continued)

Analyte (mg/kg)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Dibenzofuran	**132-64-9**	**2/ 9**	**0.0099**	**0.039**	**0.247**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Fluoranthene	206-44-0	20/ 22	0.014	3.3	0.368	0	No	Yes	Detected organic	122	USEPA Reg 5	No	Below ESV	0.03
Fluorene	86-73-7	5/ 22	0.014	0.031	0.059	0	No	Yes	Detected organic	30	PRGs	No	Below ESV	0.001
Indeno(1,2,3-cd)pyrene	193-39-5	15/ 22	0.0088	0.27	0.0925	0	No	Yes	Detected organic	109	USEPA Reg 5	No	Below ESV	0.002
Naphthalene	91-20-3	15/ 22	0.0098	0.095	0.0665	0	No	Yes	Detected organic	0.0994	USEPA Reg 5	No	Below ESV	0.96
Phenanthrene	85-01-8	19/ 22	0.01	1.6	0.165	0	No	Yes	Detected organic	45.7	USEPA Reg 5	No	Below ESV	0.04
Phenol	108-95-2	1/ 9	0.046	0.046	0.261	0	No	Yes	Detected organic	30	PRGs	No	Below ESV	0.002
Pyrene	129-00-0	20/ 22	0.013	2.5	0.293	0	No	Yes	Detected organic	78.5	USEPA Reg 5	No	Below ESV	0.03
Pesticides/PCBs														
PCB-1254	**11097-69-1**	**1/ 9**	**0.038**	**0.038**	**0.0218**	**0**	**Yes**	**Yes**	**Detected organic, PBT Compound**	**No ESV**	**No Source**	**Yes**	**Detected organic, PBT Compound**	**No ESV**
beta-BHC	**319-85-7**	**1/ 9**	**0.0018**	**0.0018**	**0.00571**	**0**	**Yes**	**Yes**	**Detected organic, PBT Compound**	**0.00398**	**USEPA Reg 5**	**Yes**	**PBT Compound**	**0.45**

[a]Background criteria for soil 0-1 ft bgs from final facility-wide background values for RVAAP, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).
[b]PBT compounds are defined by Ohio EPA 2008 as: aldrin/dieldrin, chlordane,1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE), hexachlorobenzene, hexachlorobutadiene (hexachloro-1,3-butadiene), hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC), lindane (gammahexachlorocyclohexane), alkyl-lead, mercury and its compounds, mirex, photomirex, octachlorostyrene, PCBs, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), dioxin, PCDF (furans), 1,2,3,4-tetrachlorobenzene, 1,2,4,5-tetrachlorobenzene, toxaphene, and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.
[c]Screening Level Source: See soil ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is EcoSSLs, followed by United States Department of Energy (DOE) (1997a) *Preliminary Remediation Goals for Ecological Endpoints*, followed by USEPA Region 5 ESLs.
bgs = Below ground surface
CAS = Chemical Abstract Service
COPEC = Chemical of Potential Ecological Concern
EcoSSL = Ecological Soil Screening Level
ESL = Ecological Screening Level
ESV = Ecological Screening Value
ISM = Incremental Sampling Methodology
Max = Maximum concentration
Ohio EPA = Ohio Environmental Protection Agency
PBT = Persistent, Bioaccumulative, and Toxic
PCB = Polychlorinated Biphenyl
PRG = Preliminary Remediation Goal
Reg = Region
RVAAP = Ravenna Army Ammunition Plant
SRC = Site-related Contaminant
USEPA = United States Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-9. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment at the Load Line 5 Wetland

Analyte (mg/kg)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Inorganic Chemicals															
Aluminum	7429-90-5	1/ 1	14900	14900	14900	13900	29000	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Antimony	7440-36-0	1/ 1	0.15	0.15	0.15	0	1.3	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Arsenic	7440-38-2	1/ 1	10.8	10.8	10.8	19.5	25	No	No	Below background	9.79	MacDonald et al.	No	Below background	1.10
Barium	7440-39-3	1/ 1	86.6	86.6	86.6	123	190	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Beryllium	7440-41-7	1/ 1	0.74	0.74	0.74	0.38	0.8	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Cadmium	7440-43-9	1/ 1	0.24	0.24	0.24	0	0.79	No	No	Below SRV	0.99	MacDonald et al.	No	Below SRV	0.24
Calcium	7440-70-2	1/ 1	1570	1570	1570	5510	21000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	1/ 1	16.7	16.7	16.7	18.1	29	No	No	Below background	43.4	MacDonald et al.	No	Below background	0.38
Cobalt	7440-48-4	1/ 1	8.1	8.1	8.1	9.1	12	No	No	Below background	50	USEPA Reg 5	No	Below background	0.16
Copper	7440-50-8	1/ 1	12.9	12.9	12.9	27.6	32	No	No	Below background	31.6	MacDonald et al.	No	Below background	0.41
Iron	7439-89-6	1/ 1	24500	24500	24500	28200	41000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	7439-92-1	1/ 1	21	21	21	27.4	47	No	No	Below background	35.8	MacDonald et al.	No	Below background	0.59
Magnesium	7439-95-4	1/ 1	2160	2160	2160	2760	7100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	1/ 1	620	620	620	1950	1500	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Mercury	**7439-97-6**	**1/ 1**	**0.075**	**0.075**	**0.075**	**0.059**	**0.12**	**Yes**	**Yes**	**PBT Compound**	**0.18**	**MacDonald et al.**	**Yes**	**PBT Compound**	**0.42**
Nickel	7440-02-0	1/ 1	15.2	15.2	15.2	17.7	33	No	No	Below background	22.7	MacDonald et al.	No	Below background	0.67
Potassium	7440-09-7	1/ 1	1110	1110	1110	1950	6800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	1/ 1	0.92	0.92	0.92	1.7	1.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Silver	7440-22-4	1/ 1	0.078	0.078	0.078	0	0.43	No	No	Below SRV	0.5	USEPA Reg 5	No	Below SRV	0.16
Sodium	7440-23-5	1/ 1	40.6	40.6	40.6	112	--	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	1/ 1	0.26	0.26	0.26	0.89	4.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Vanadium	7440-62-2	1/ 1	26.8	26.8	26.8	26.1	40	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Zinc	7440-66-6	1/ 1	74.7	74.7	74.7	532	160	No	No	Below background	121	MacDonald et al.	No	Below background	0.62
Semi-volatile Organic Compounds															
Benzo(a)pyrene	50-32-8	1/ 1	0.013	0.013	0.013	0	--	No	Yes	Detected organic	0.15	MacDonald et al.	No	Below ESV	0.09
Benzo(b)fluoranthene	205-99-2	1/ 1	0.021	0.021	0.021	0	--	No	Yes	Detected organic	10.4	USEPA Reg 5	No	Below ESV	0.002
Chrysene	218-01-9	1/ 1	0.016	0.016	0.016	0	--	No	Yes	Detected organic	0.166	MacDonald et al.	No	Below ESV	0.10
Fluoranthene	206-44-0	1/ 1	0.024	0.024	0.024	0	--	No	Yes	Detected organic	0.423	MacDonald et al.	No	Below ESV	0.06
Phenanthrene	85-01-8	1/ 1	0.0094	0.0094	0.0094	0	--	No	Yes	Detected organic	0.204	MacDonald et al.	No	Below ESV	0.05
Pyrene	129-00-0	1/ 1	0.018	0.018	0.018	0	--	No	Yes	Detected organic	0.195	MacDonald et al.	No	Below ESV	0.09

[a]Background criteria for sediment from final facility-wide background values for RVAAP, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).
[b]PBT compounds are defined by Ohio Environmental Protection Agency (Ohio EPA) 2008 as: aldrin/dieldrin, chlordane,1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE), hexachlorobenzene, hexachlorobutadiene (hexachloro-1,3-butadiene), hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC), lindane (gammahexachlorocyclohexane), alkyl-lead, mercury and its compounds, mirex, photomirex, octachlorostyrene, polychlorinated biphenyls (PCBs), 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), dioxin, PCDF (furans), 1,2,3,4-tetrachlorobenzene, 1,2,4,5-tetrachlorobenzene, toxaphene, and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.
[c]Ecological Screening Value (ESV): See sediment ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is MacDonald et al. *Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems*, Arch. Environ. Contam. Toxicol. Volume 39, Issue 1. January 2000, followed by USEPA Region 5 ESLs.
--= SRV not available
AOC = Area of Concern
CAS = Chemical Abstract Service
COPEC = Chemical of Potential Ecological Concern
ESL = Ecological Screening Level
Max = Maximum concentration
PBT = Persistent, Bioaccumulative, and Toxic
Reg = Region
SRC = Site-related Contaminant
SRV = Sediment Reference Value
USEPA = United States Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-10. SRC and Integrated COPEC Screening with Maximum to OMZM Ratio for Surface Water at the Load Line 5 Wetland

Analyte (mg/L)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Inorganic Chemicals														
Aluminum	7429-90-5	1/ 1	0.129	0.129	0.129	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	1.48
Arsenic	7440-38-2	1/ 1	0.0018	0.0018	0.0018	0.0032	No	No	Below background	0.34	Ohio Administrative Code	No	Below background	0.01
Barium	7440-39-3	1/ 1	0.0107	0.0107	0.0107	0.0475	No	No	Below background	2	Ohio Administrative Code	No	Below background	0.01
Calcium	7440-70-2	1/ 1	9.16	9.16	9.16	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Cobalt	7440-48-4	1/ 1	0.00054	0.00054	0.00054	0	No	Yes	Exceeds background	0.22	Ohio Administrative Code	No	Below ESV	0.002
Copper	7440-50-8	1/ 1	0.0016	0.0016	0.0016	0.0079	No	No	Below background	0.014	Ohio Administrative Code[d]	No	Below background	0.11
Iron	7439-89-6	1/ 1	1.5	1.5	1.5	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	1.50
Lead	7439-92-1	1/ 1	0.00054	0.00054	0.00054	0	No	Yes	Exceeds background	0.12	Ohio Administrative Code[d]	No	Below ESV	0.005
Magnesium	7439-95-4	1/ 1	1.89	1.89	1.89	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	1/ 1	0.136	0.136	0.136	0.391	No	No	Below background	0.12	Tier II (Suter & Tsao 1996)	No	Below background	1.13
Nickel	7440-02-0	1/ 1	0.0014	0.0014	0.0014	0	No	Yes	Exceeds background	0.47	Ohio Administrative Code[d]	No	Below ESV	0.003
Potassium	7440-09-7	1/ 1	3.25	3.25	3.25	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Sodium	7440-23-5	1/ 1	0.781	0.781	0.781	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Vanadium	7440-62-2	1/ 1	0.00054	0.00054	0.00054	0	No	Yes	Exceeds background	0.15	Ohio Administrative Code	No	Below ESV	0.004
Volatile Organic Compounds														
Toluene	108-88-3	1/ 1	0.00022	0.00022	0.00022	0	No	Yes	Detected organic	0.56	Ohio Administrative Code	No	Below ESV	0.0004

[a]Background criteria for surface water from final facility-wide background values for RVAAP, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).
[b]PBT compounds are defined by Ohio EPA 2008 as: aldrin/dieldrin, chlordane,1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE), hexachlorobenzene, hexachlorobutadiene (hexachloro-1,3-butadiene), hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC), lindane (gammahexachlorocyclohexane), alkyl-lead, mercury and its compounds, mirex, photomirex, octachlorostyrene, polychlorinated biphenyls (PCBs), 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), dioxin, PCDF (furans), 1,2,3,4-tetrachlorobenzene, 1,2,4,5-tetrachlorobenzene, toxaphene, and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.
[c]Screening level source: see surface water ESV appendix table. Hierarchy of values according to Ohio Environmental Protection Agency (Ohio EPA) risk assessment guidance and letter from Ohio EPA is Ohio EPA outside mixing zone maximum (OMZM), followed by NAWQC or Tier II values, followed by USEPA Region 5 ESLs.
[d]Value is hardness dependent
CAS = Chemical Abstract Service
COPEC = Chemical of Potential Ecological Concern
ESL = Ecological Screening Level
ESV = Ecological Screening Value
Max = Maximum Concentration
NAWQC = National Ambient Water Quality Criteria
Ohio EPA = Ohio Environmental Protection Agency
PBT = Persistent, Bioaccumulative, and Toxic
SRC = Site-related Contaminant
USEPA = United States Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-11. SRC and Integrated COPEC Screening with Average to OMZA Ratio for Surface Water at the Load Line 5 Wetland

Analyte (mg/L)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Average to ESV[e]
Inorganic Chemicals														
Aluminum	7429-90-5	1/ 1	0.129	0.129	0.129	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	1.48
Arsenic	7440-38-2	1/ 1	0.0018	0.0018	0.0018	0.0032	No	No	Below background	0.15	Ohio Administrative Code OMZA	No	Below background	0.01
Barium	7440-39-3	1/ 1	0.0107	0.0107	0.0107	0.0475	No	No	Below background	0.22	Ohio Administrative Code OMZA	No	Below background	0.05
Calcium	7440-70-2	1/ 1	9.16	9.16	9.16	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Cobalt	7440-48-4	1/ 1	0.00054	0.00054	0.00054	0	No	Yes	Exceeds background	0.024	Ohio Administrative Code OMZA	No	Below ESV	0.02
Copper	7440-50-8	1/ 1	0.0016	0.0016	0.0016	0.0079	No	No	Below background	0.009	Ohio Administrative Code OMZA[d]	No	Below background	0.18
Iron	7439-89-6	1/ 1	1.5	1.5	1.5	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	1.50
Lead	7439-92-1	1/ 1	0.00054	0.00054	0.00054	0	No	Yes	Exceeds background	0.0051	Ohio Administrative Code OMZA[d]	No	Below ESV	0.11
Magnesium	7439-95-4	1/ 1	1.89	1.89	1.89	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	1/ 1	0.136	0.136	0.136	0.391	No	No	Below background	0.12	Tier II (Suter & Tsao 1996)	No	Below background	1.13
Nickel	7440-02-0	1/ 1	0.0014	0.0014	0.0014	0	No	Yes	Exceeds background	0.052	Ohio Administrative Code OMZA[d]	No	Below ESV	0.03
Potassium	7440-09-7	1/ 1	3.25	3.25	3.25	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Sodium	7440-23-5	1/ 1	0.781	0.781	0.781	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Vanadium	7440-62-2	1/ 1	0.00054	0.00054	0.00054	0	No	Yes	Exceeds background	0.044	Ohio Administrative Code OMZA	No	Below ESV	0.01
Volatile Organic Compounds														
Toluene	108-88-3	1/ 1	0.00022	0.00022	0.00022	0	No	Yes	Detected organic	0.062	Ohio Administrative Code OMZA	No	Below ESV	0.004

[a] Background criteria for surface water from final facility-wide background values for RVAAP, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).

[b] PBT compounds are defined by Ohio EPA 2008 as: aldrin/dieldrin, chlordane,1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE), hexachlorobenzene, hexachlorobutadiene (hexachloro-1,3-butadiene), hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC), lindane (gammahexachlorocyclohexane), alkyl-lead, mercury and its compounds, mirex, photomirex, octachlorostyrene, polychlorinated biphenyls (PCBs), 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), dioxin, PCDF (furans), 1,2,3,4-tetrachlorobenzene, 1,2,4,5-tetrachlorobenzene, toxaphene, and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.

[c] Screening level source: see surface water ESV appendix table. Hierarchy of values according to Ohio Environmental Protection Agency (Ohio EPA) risk assessment guidance and letter from Ohio EPA is Ohio EPA outside mixing zone average (OMZA), followed by NAWQC or Tier II values, followed by USEPA Region 5 ESLs.

[d] Value is hardness dependent

[e] Because there is only one surface water sample at Load Line 5, maximum and average concentrations are equal, and this ratio represents comparison of the OMZA to both the average and the maximum concentrations.

CAS = Chemical Abstract Service
COPEC = Chemical of Potential Ecological Concern
ESL = Ecological Screening Level
ESV = Ecological Screening Value
Max = Maximum Concentration
NAWQC = National Ambient Water Quality Criteria
Ohio EPA = Ohio Environmental Protection Agency
OMZA = Outside Mixing Zone Average
PBT = Persistent, Bioaccumulative, and Toxic
SRC = Site-related Contaminant
USEPA = United States Environmental Protection Agency
Bold = Chemical is a COPEC

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