APPENDIX H

Ecological Risk Assessment Information and Data

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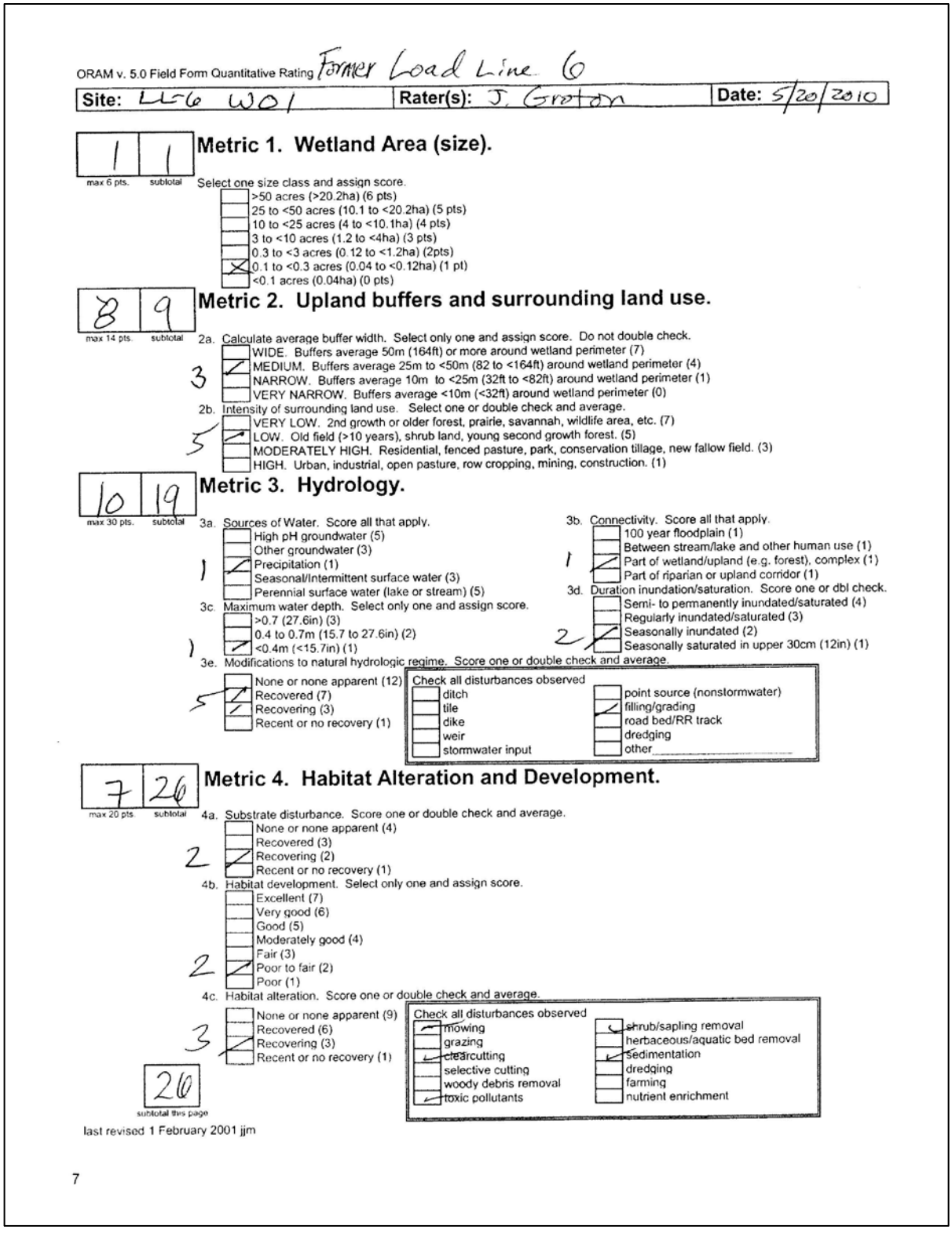
ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
ASL	Above Screening Level
bgs	Below Ground Surface
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	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
HQ	Hazard Quotient
HTRW	Hazardous, Toxic, and Radioactive Waste
INRMP	Integrated Natural Resources Management Plan
LOAEL	Lowest Observed Adverse Effects Level
NAWQC	National Ambient Water Quality Criteria
NOAEL	No Observed Adverse Effects Level
NTX	Toxicity Information Not Available
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
PAH	Polycyclic Aromatic Hydrocarbon
PBT	Persistent, Bioaccumulative, and Toxic
PCB	Polychlorinated Biphenyl
PLS	Planning Level Survey
PRG	Preliminary Remediation Goal
RCRA	Resource Conservation and Recovery Act
RVAAP	Ravenna Army Ammunition Plant
SRC	Site-related Contaminant

ACRONYMS AND ABBREVIATIONS (CONTINUED)

SRV	Sediment Reference Value
T&E	Threatened and Endangered Species
TRV	Toxicity Reference Value
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

Photograph H-1. Winter Scene of Vegetation in the Habitat Area at Load Line 6 (photograph taken November 21, 2008)



ORAM v. 5.0 Field Form Quantitative Rating Former Load Line 6

Site: LL6 WO1 | Rater(s): J. Groton | Date: 5/20/2010

Metric 1. Wetland Area (size). (max 6 pts.) 1 | (subtotal) 1

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)
- [X] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

Metric 2. Upland buffers and surrounding land use. (max 14 pts.) 8 | (subtotal) 9

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)
- [/] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4) — 3
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

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)
- [/] LOW. Old field (>10 years), shrub land, young second growth forest. (5) — 5
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

Metric 3. Hydrology. (max 30 pts.) 10 | (subtotal) 19

3a. Sources of Water. Score all that apply.
- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [/] Precipitation (1) — 1
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.
- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [/] Part of wetland/upland (e.g. forest), complex (1) — 1
- [ ] Part of riparian or upland corridor (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)
- [/] <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)
- [/] Seasonally inundated (2) — 2
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.
- [ ] None or none apparent (12)
- [/] Recovered (7) — 5
- [/] Recovering (3)
- [ ] Recent or no recovery (1)

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. (max 20 pts.) 7 | (subtotal) 26

4a. Substrate disturbance. Score one or double check and average.
- [ ] None or none apparent (4)
- [ ] Recovered (3)
- [/] Recovering (2) — 2
- [ ] Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.
- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [/] Poor to fair (2) — 2
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.
- [ ] None or none apparent (9)
- [ ] Recovered (6)
- [/] Recovering (3) — 3
- [/] Recent or no recovery (1)

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

26 (subtotal this page)

last revised 1 February 2001 jjm

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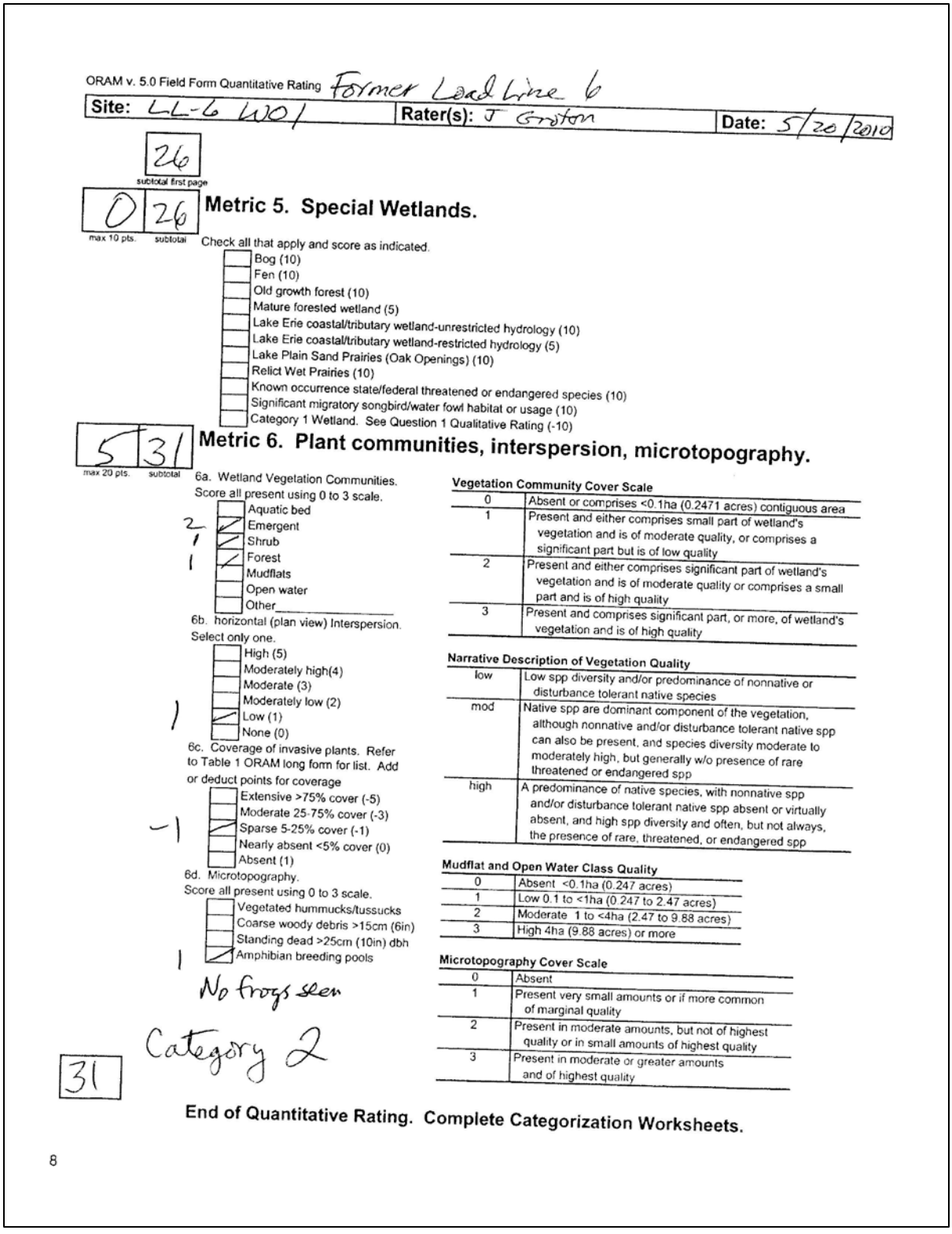
Figure H-1. Ohio Rapid Assessment Method Worksheet for Wetland 1



ORAM v. 5.0 Field Form Quantitative Rating Former Load Line 6

Site: LL-6 WO1 | Rater(s): J Groton | Date: 5/20/2010

26 (subtotal first page)

0 (max 10 pts.) | 26 (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)

5 (max 20 pts.) | 31 (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 1
- [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)
- [x] Sparse 5-25% cover (-1) -1
- [ ] Nearly absent <5% cover (0)
- [ ] Absent (1)

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

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

No frogs seen

31

Category 2

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

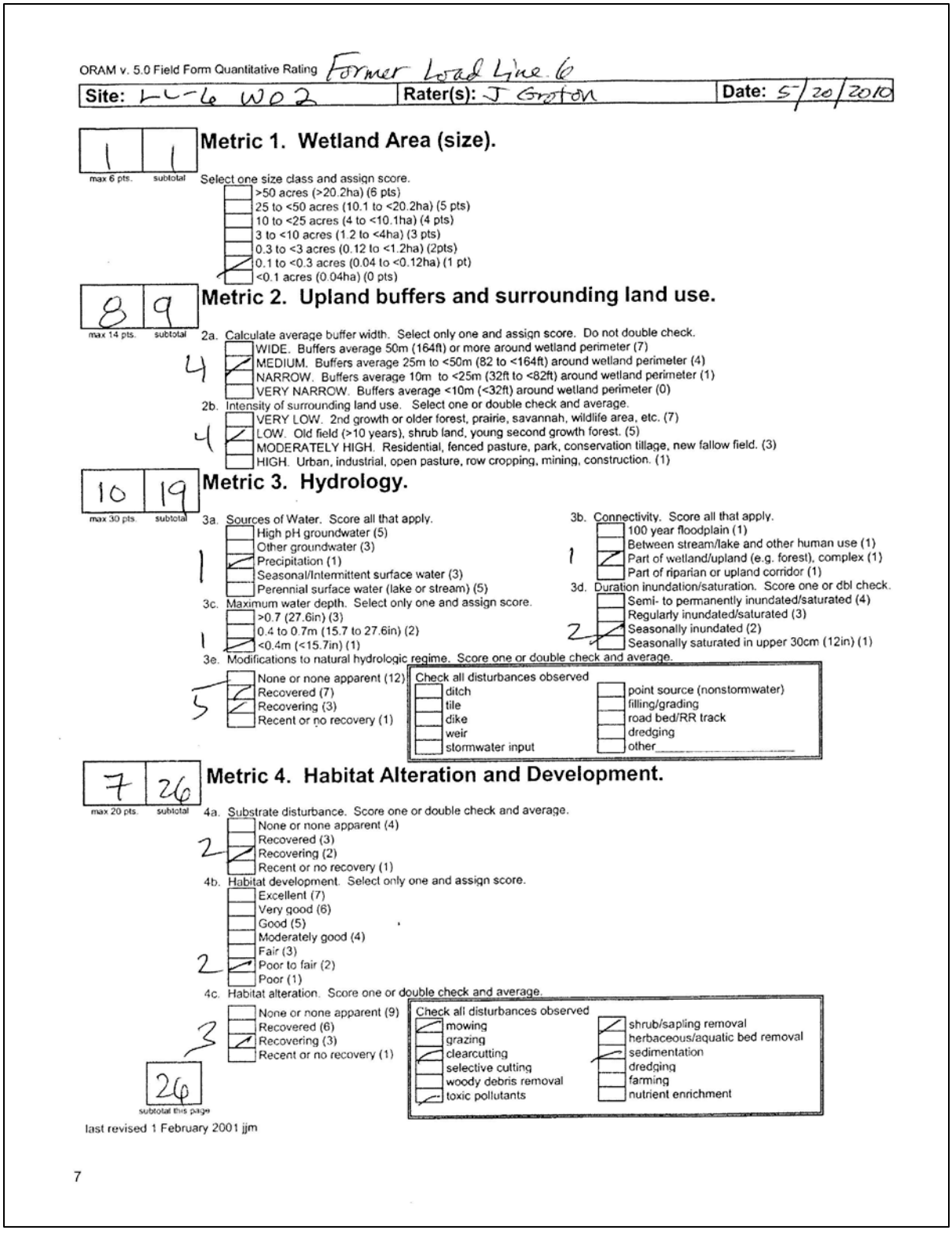
Microtopography Cover Scale

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

End of Quantitative Rating. Complete Categorization Worksheets.

8

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



ORAM v. 5.0 Field Form Quantitative Rating Former Load Line 6

Site: LL-6 WO2 | Rater(s): J Groton | Date: 5/20/2010

Metric 1. Wetland Area (size).

1 (max 6 pts.) | 1 (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)
- [x] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

Metric 2. Upland buffers and surrounding land use.

8 (max 14 pts.) | 9 (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)

4

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)

4

Metric 3. Hydrology.

10 (max 30 pts.) | 19 (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)
- [x] Recovering (3)
- [ ] Recent or no recovery (1)

5

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 (max 20 pts.) | 26 (subtotal)

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

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

2

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

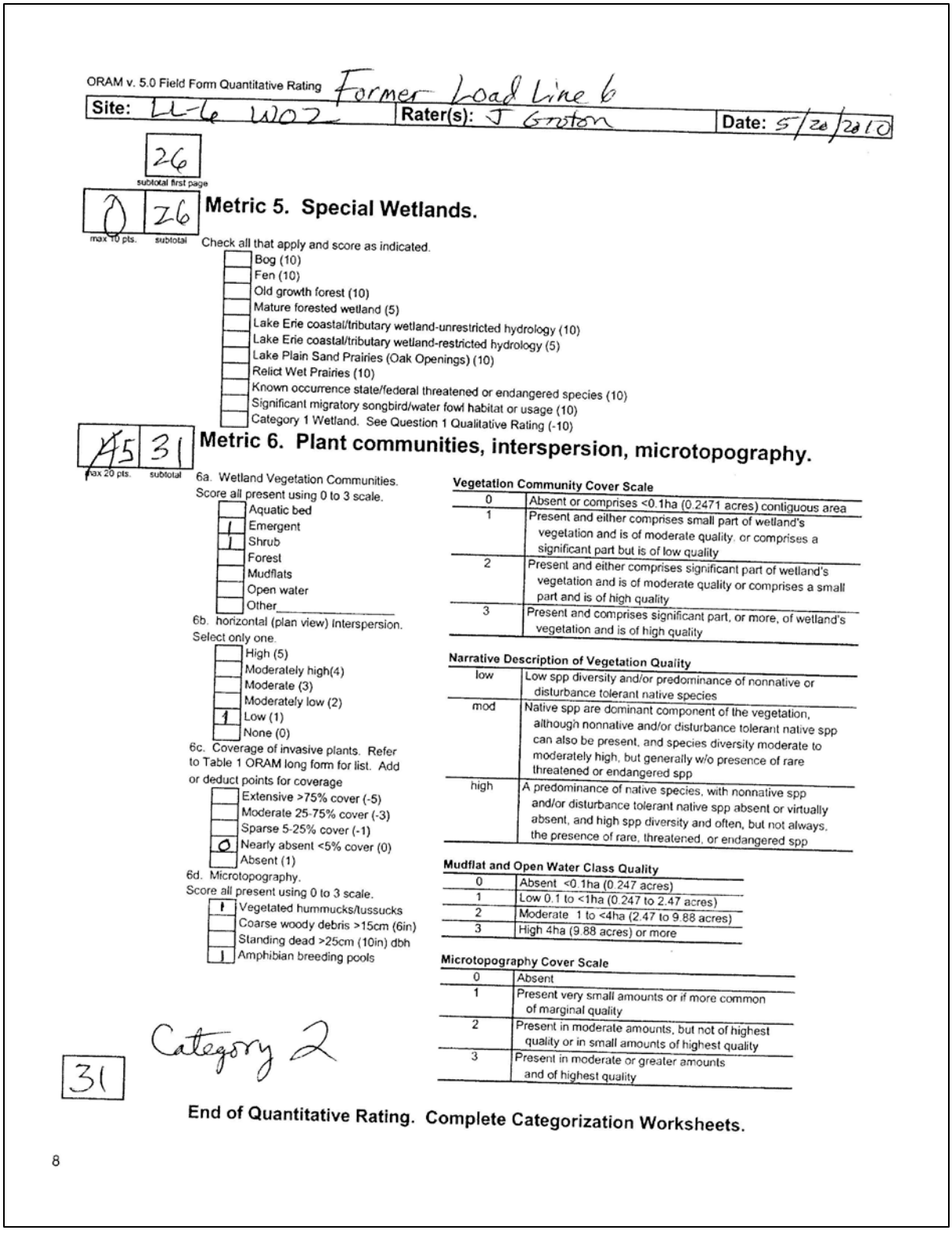
- [x] mowing
- [ ] grazing
- [x] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [x] toxic pollutants
- [x] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [x] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient enrichment

26 subtotal this page

last revised 1 February 2001 jjm

7

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



ORAM v. 5.0 Field Form Quantitative Rating — Former Load Line 6

Site: LL-6 WO2 | Rater(s): J Groton | Date: 5/20/2010

26 (subtotal first page)

0 (max 10 pts.) | 26 (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)

5 (max 20 pts.) | 31 (subtotal)

Metric 6. Plant communities, interspersion, microtopography.

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

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

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

- [ ] High (5)
- [ ] Moderately high(4)
- [ ] Moderate (3)
- [ ] Moderately low (2)
- [1] 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)
- [ ] Sparse 5-25% cover (-1)
- [0] Nearly absent <5% cover (0)
- [ ] Absent (1)

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

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

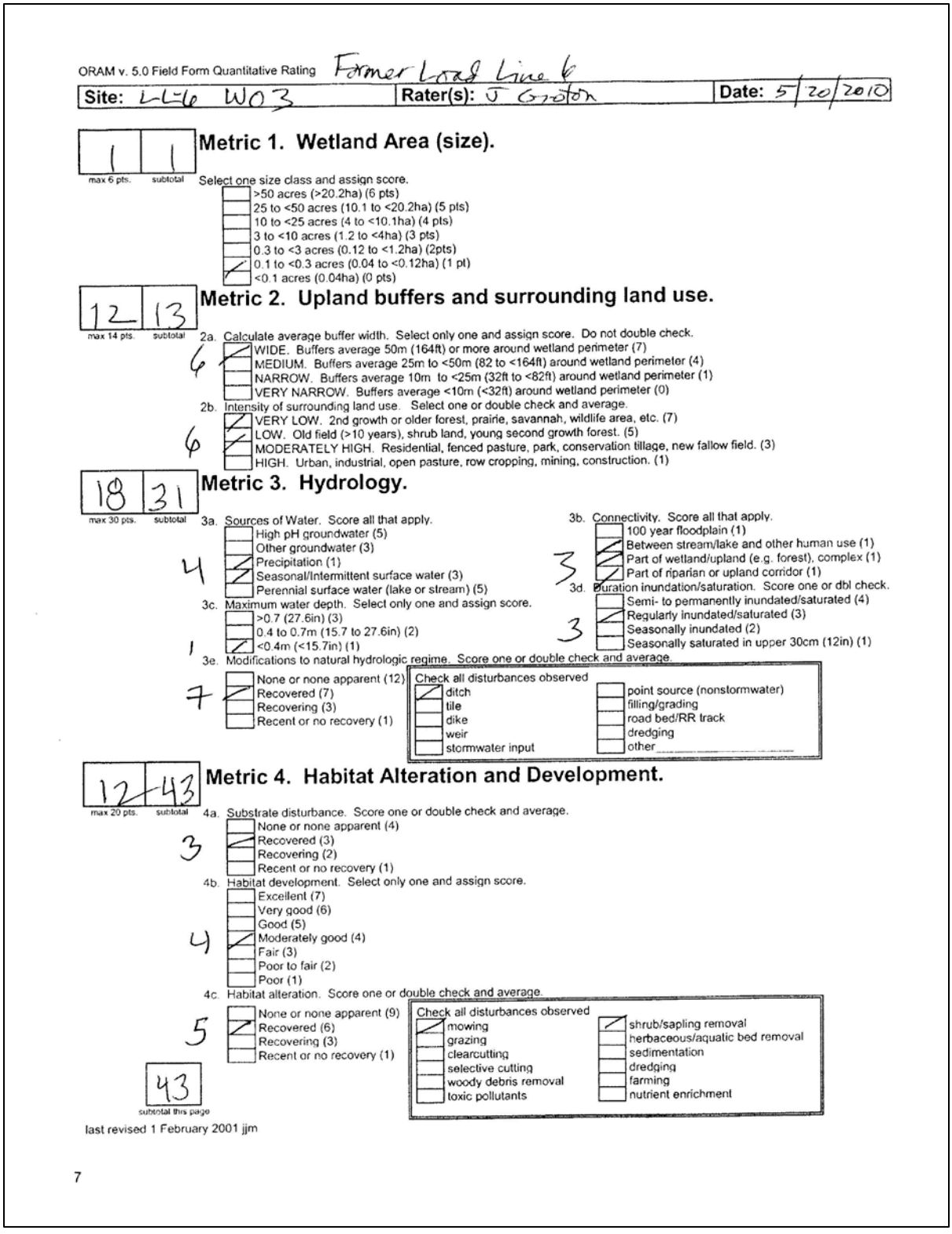
31

Category 2

End of Quantitative Rating. Complete Categorization Worksheets.

8

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



ORAM v. 5.0 Field Form Quantitative Rating — Former Load Line 6

Site: LL6 WO3 | Rater(s): J Groton | Date: 5/20/2010

Metric 1. Wetland Area (size). — 1 / 1 (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)
- [x] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

Metric 2. Upland buffers and surrounding land use. — 12 / 13 (max 14 pts. / subtotal)

2a. Calculate average buffer width. Select only one and assign score. Do not double check. — 6

- [x] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] 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)

2b. Intensity of surrounding land use. Select one or double check and average. — 6

- [x] 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)

Metric 3. Hydrology. — 18 / 31 (max 30 pts. / subtotal)

3a. Sources of Water. Score all that apply. — 4

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

3b. Connectivity. Score all that apply. — 3

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

3c. Maximum water depth. Select only one and assign score. — 1

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

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

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

3e. Modifications to natural hydrologic regime. Score one or double check and average. — 7

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

Check all disturbances observed

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

Metric 4. Habitat Alteration and Development. — 12 / 43 (max 20 pts. / subtotal)

4a. Substrate disturbance. Score one or double check and average. — 3

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

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

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

4c. Habitat alteration. Score one or double check and average. — 5

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

Check all disturbances observed

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

43 (subtotal this page)

last revised 1 February 2001 jjm

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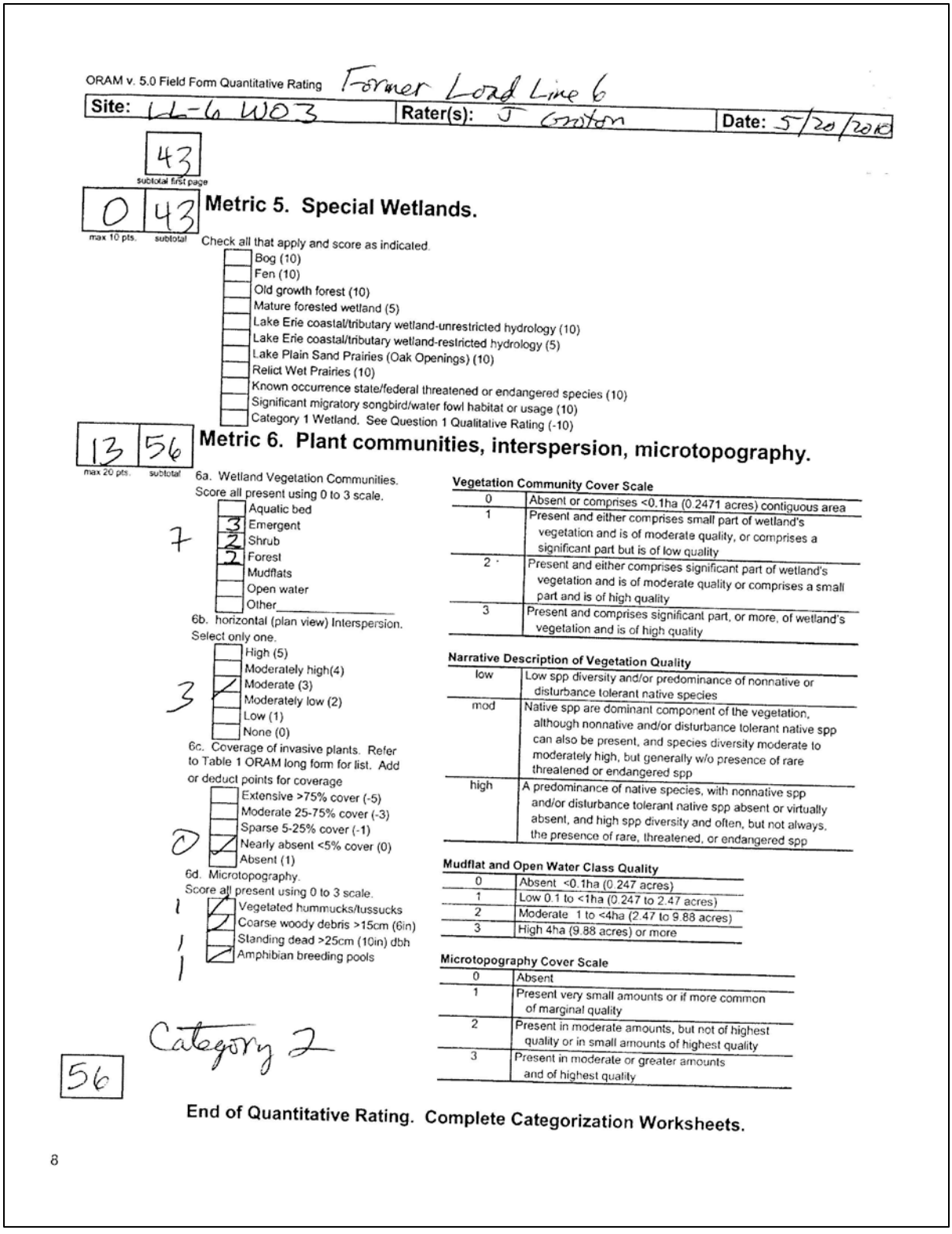
Figure H-3. Ohio Rapid Assessment Method Worksheet for Wetland 3



ORAM v. 5.0 Field Form Quantitative Rating Former Load Line 6

Site: LL-6 WO3 | Rater(s): J Gaston | Date: 5/20/2015

43 subtotal first page

0 max 10 pts. | 43 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)

13 max 20 pts. | 56 subtotal

Metric 6. Plant communities, interspersion, microtopography.

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

7

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

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

3

- [ ] 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

0

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

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

1

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

1

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

1

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

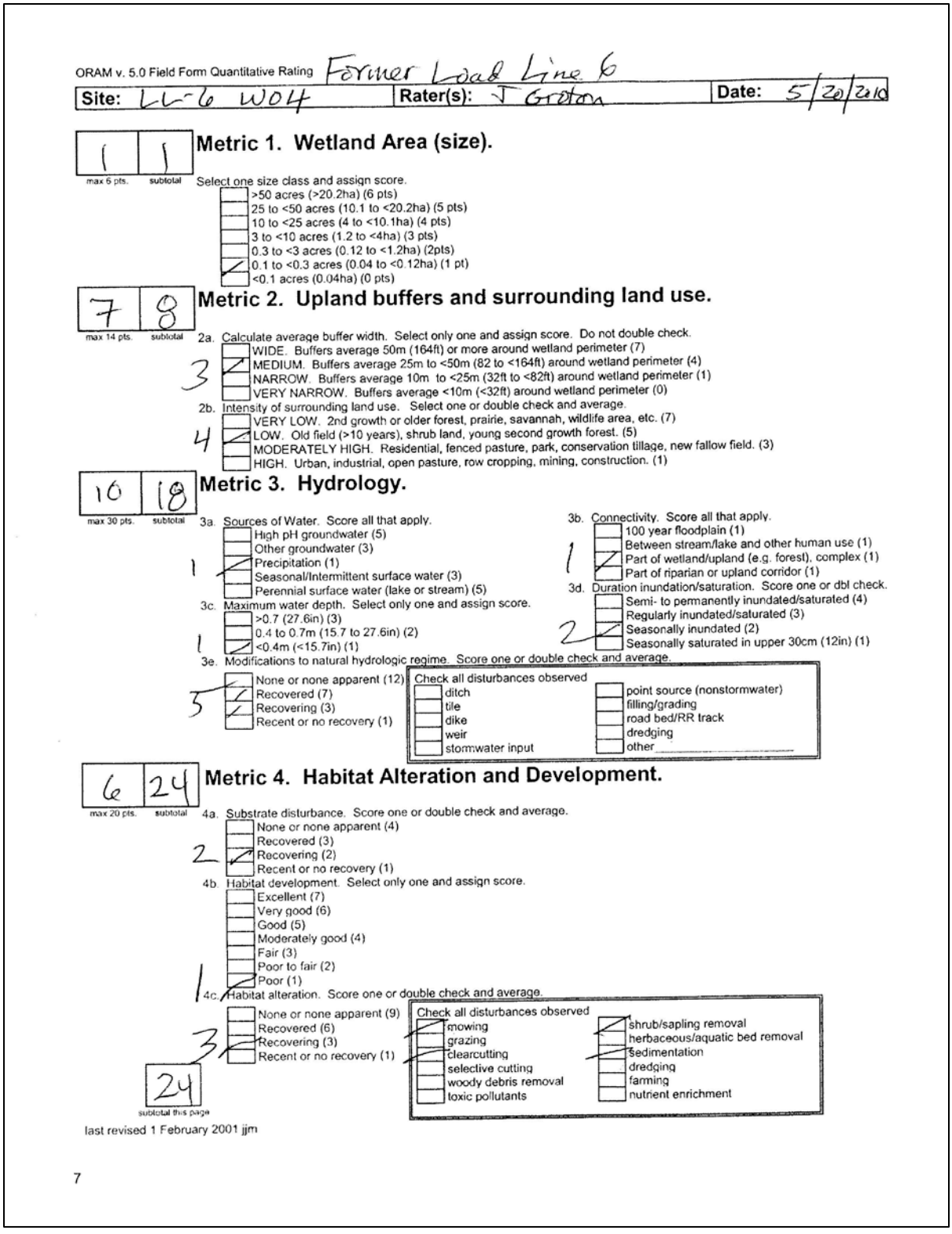
Category 2

56

End of Quantitative Rating. Complete Categorization Worksheets.

8

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



ORAM v. 5.0 Field Form Quantitative Rating — Former Load Line 6

Site: LL-6 W04 | Rater(s): J Groton | Date: 5/20/2010

Metric 1. Wetland Area (size).

max 6 pts. | subtotal: 1 | 1

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)
- [x] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

Metric 2. Upland buffers and surrounding land use.

max 14 pts. | subtotal: 7 | 8

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) — 3
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

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) — 4
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

Metric 3. Hydrology.

max 30 pts. | subtotal: 10 | 18

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

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

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) — 1
- [ ] Part of riparian or upland corridor (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) — 2
- [ ] Seasonally saturated in upper 30cm (12in) (1)

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

- [ ] None or none apparent (12)
- [x] Recovered (7) — 5
- [x] Recovering (3)
- [ ] Recent or no recovery (1)

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.

max 20 pts. | subtotal: 6 | 24

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

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

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

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

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

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

Check all disturbances observed

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

subtotal this page: 24

last revised 1 February 2001 jjm

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Figure H-4. Ohio Rapid Assessment Method Worksheet for Wetland 4

ORAM v. 5.0 Field Form Quantitative Rating Former Load Line 6

Site: LL-6 W04 | Rater(s): J Groton | Date: 5/20/2010

24 subtotal first page

0 | 24 **Metric 5. Special Wetlands.**

max 10 pts. | 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)

5 | 29 **Metric 6. Plant communities, interspersion, microtopography.**

max 20 pts. | subtotal

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

2

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

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

1

- [ ] High (5)
- [ ] Moderately high(4)
- [ ] Moderate (3)
- [ ] Moderately low (2)
- [1] 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)
- [/] Sparse 5-25% cover (-1)
- [ ] Nearly absent <5% cover (0)
- [ ] Absent (1)

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

1

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

2

Category 1

29

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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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

End of Quantitative Rating. Complete Categorization Worksheets.

8

Figure H-4. Ohio Rapid Assessment Method Worksheet for Wetland 4 (continued)

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Table H-1. Historical ERA COPEC Screen for Soil at Load Line 6

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Site Background Criteria[1]	Detects > Site Background Criteria[2]	Max Conc > Bkg Conc	Surface Soil Screening Level		HQ	Bio Chemical	PBT Chemical	Selected as a COPC?	Rationale[3]
										Value	Source					
Volatile Organics (µg/kg)																
ACETONE	1/11	12	12	3.06	7.38	LL6SB-044-0001-SO-D	NA	NA	NA	2500	d	0.005	NO	NO	NO	BSL
METHYLENE CHLORIDE	1/11	4.8 Ja	4.8 Ja	1.59	3.28	LL6SB-044-0001-SO-D	NA	NA	NA	4050	d	0.001	NO	NO	NO	BSL
Semivolatile Organics (µg/kg)																
2-METHYLNAPHTHALENE	1/11	22 Ja	22 Ja	2.81	22	LL6SB-024-0001-SO	NA	NA	NA	3240	d	0.01	NO	NO	NO	BSL
ACENAPHTHENE	2/11	4.6 Ja	69	7.37	36.8	LL6SB-024-0001-SO	NA	NA	NA	20000	a	0.003	YES	NO	**YES**	BIO
ANTHRACENE	3/11	1.7 Ja	130	13.1	46.8	LL6SB-024-0001-SO	NA	NA	NA	1480000	d	0.0001	YES	NO	**YES**	BIO
BENZO(A)ANTHRACENE	6/11	4.9 J	290	33.3	60.4	LL6SB-024-0001-SO	NA	NA	NA	5210	d	0.06	YES	NO	**YES**	BIO
BENZO(A)PYRENE	6/11	3.7 J	200	25	44.8	LL6SB-024-0001-SO	NA	NA	NA	1520	d	0.13	YES	NO	**YES**	BIO
BENZO(B)FLUORANTHENE	6/11	4 J	230 H	28.5	51.2	LL6SB-024-0001-SO	NA	NA	NA	59800	d	0.004	YES	NO	**YES**	BIO
BENZO(G,H,I)PERYLENE	5/11	5.5 Ja	83	12.1	25.2	LL6SB-024-0001-SO	NA	NA	NA	119000	d	0.001	YES	NO	**YES**	BIO
BENZO(K)FLUORANTHENE	5/11	4.2 Ja	160	20.1	42.3	LL6SB-024-0001-SO	NA	NA	NA	148000	d	0.001	YES	NO	**YES**	BIO
BIS(2-ETHYLHEXYL)PHTHALATE	7/11	16 Ja	160 Ja	35.4	52.3	LL6SB-044-0001-SO	NA	NA	NA	926	d	0.17	NO	NO	NO	BSL
CARBAZOLE	1/11	140 Ja	140 Ja	31.6	140	LL6SB-024-0001-SO	NA	NA	NA	NA	NA	NA	NO	NO	**YES**	NTX
CHRYSENE	6/11	4.7 J	300	34.8	62.9	LL6SB-024-0001-SO	NA	NA	NA	4730	d	0.06	YES	NO	**YES**	BIO
DIBENZO(A,H)ANTHRACENE	4/11	4.8 Ja	52	9.56	24	LL6SB-024-0001-SO	NA	NA	NA	18400	d	0.003	YES	NO	**YES**	BIO
DIBENZOFURAN	1/11	45 Ja	45 Ja	5.55	45	LL6SB-024-0001-SO	NA	NA	NA	NA	NA	NA	NO	NO	**YES**	NTX
FLUORANTHENE	6/11	6.8 Ja	760	84.2	154	LL6SB-024-0001-SO	NA	NA	NA	122000	d	0.01	YES	NO	**YES**	BIO
FLUORENE	1/11	57	57	6.05	57	LL6SB-024-0001-SO	NA	NA	NA	30000	b	0.002	YES	NO	**YES**	BIO
INDENO(1,2,3-CD)PYRENE	4/11	7.8 Ja	88	13.1	33.9	LL6SB-024-0001-SO	NA	NA	NA	109000	d	0.001	YES	NO	**YES**	BIO
NAPHTHALENE	1/11	78	78	8.0	78	LL6SB-024-0001-SO	NA	NA	NA	99.4	d	0.78	NO	NO	NO	BSL
PHENANTHRENE	5/11	6.2 Ja	510	52.2	114	LL6SB-024-0001-SO	NA	NA	NA	45700	d	0.01	YES	NO	**YES**	BIO
PYRENE	6/11	5 Ja	510	57.3	104	LL6SB-024-0001-SO	NA	NA	NA	78500	d	0.01	YES	NO	**YES**	BIO
Pesticides PCBs (µg/kg)																
AROCLOR-1254	1/10	33	33	4.36	33.0	LL6SS-010-0001-SO	NA	NA	NA	371	a[4]	0.09	YES	YES	**YES**	BIO,PBT
Energetics (µg/kg)																
HMX	1/17	170 Ja	190 Ja	70.6	180	LL6SS-003-0001-SO	NA	NA	NA	NA	NA	NA	NO	NO	**YES**	NTX
Total Metals (mg/kg)																
ALUMINUM	75/75	1990	21000	12536	12536	LL6SB-012-0001-SO-D	17700	5/75	YES	50	c	420	NO	NO	**YES**	ASL
ANTIMONY	13/75	0.074 B	0.62 B	0.25	0.271	LL6SS-025-0001-SO	0.96	0/75	NO	5	a	0.12	NO	NO	NO	BSL
ARSENIC	75/75	2.2	41	12	12	LL6SS-007-0001-SO	15.4	11/75	YES	9.9	a	4.1	YES	NO	**YES**	ASL,BIO
BARIUM	75/75	34	180	74.5	74.5	LL6SS-032-0001-SO	88.4	17/75	YES	283	a	0.64	NO	NO	NO	BSL
BERYLLIUM	75/75	0.2 B	2.1	0.62	0.62	LL6SS-032-0001-SO and Dup	0.88	11/75	YES	10	a	0.21	NO	NO	NO	BSL
CADMIUM	13/75	0.11 B	6.8	0.199	0.932	LL6SS-002-0001-SO	NA	NA	NA	4	a	1.7	YES	NO	**YES**	ASL,BIO
CALCIUM	75/75	120	184000 H	12173	12173	LL6SS-002-0001-SO	15800	13/75	YES	NA	NA	NA	NO	NO	NO	NUT
CHROMIUM	75/75	5.7	29	16.7	16.7	LL6SB-015-0001-SO	17.4	31/75	YES	0.4	a	73	YES	NO	**YES**	ASL,BIO
COBALT	75/75	2.3	33	9.09	9.09	LL6SB-016-0001-SO, LL6SB-018-0001-SO-D	10.4	17/75	YES	20	a	1.7	NO	NO	**YES**	ASL
COPPER	75/75	5	627	23.8	23.8	LL6SS-002-0001-SO	17.7	41/75	YES	60	a	10.5	YES	NO	**YES**	ASL,BIO
IRON	75/75	9940 H	45000 H	23460	23460	LL6SB-030-0001-SO	23100	36/75	YES	200	b[5]	225	NO	NO	**YES**	ASL
LEAD	75/75	7.5	250	29.2	29.2	LL6SB-015-0001-SO-D	19.1	30/75	YES	40.5	a	6.2	YES	NO	**YES**	ASL,BIO
MAGNESIUM	75/75	910	8800	3303	3303	LL6SS-032-0001-SO	3030	36/75	YES	NA	NA	NA	NO	NO	NO	NUT
MANGANESE	75/75	45	1800	445	445	LL6SS-032-0001-SO	1450	0/75[6]	YES	100	b[5]	18	NO	NO	**YES**	ASL
MERCURY	74/75	0.0081 B	0.6	0.0414	0.0420	LL6SS-017-0001-SO	0.04	10/75	YES	0.00051	a	1176	YES	YES	**YES**	ASL,BIO,PBT
NICKEL	75/75	7.8	36	19.3	19.3	LL6SB-015-0001-SO	21.1	24/75	YES	30	a	1.2	YES	NO	**YES**	ASL,BIO
POTASSIUM	75/75	531	2800	1287	1287	LL6SS-033-0001-SO	927	59/75	YES	NA	NA	NA	NO	NO	NO	NUT
SELENIUM	29/75	0.45 B	2.5	0.516	0.951	LL6SB-030-0001-SO	1.4	8/75	YES	0.21	a	12	YES	NO	**YES**	ASL,BIO
SODIUM	31/75	93 B	1800	426	960	LL6SB-004-0001-SO	123	29/75	YES	NA	NA	NA	NO	NO	NO	NUT
THALLIUM	4/75	0.22 B	0.33	0.233	0.285	LL6SD-011-0001-SD	0.91	0/75	NO	1	a	0.33	NO	NO	NO	BKG,BSL
VANADIUM	75/75	5.6	32	21.3	21.3	LL6SB-018-0001-SO	31.1	0/75[6]	YES	2	a	16	NO	NO	**YES**	ASL
ZINC	75/75	28	280	66.4	66.4	LL6SB-015-0001-SO-D	61.8	28/75	YES	8.5	a	33	YES	NO	**YES**	ASL,BIO
Miscellaneous Parameters																
NITROCELLULOSE (µg/kg)	10/10	720 B	10100	2454	2454	LL6SS-010-0001-SO	NA	NA	NA	NA	NA	NA	NO	NO	**YES**	NTX

Notes:
Shaded cells are chemicals that are retained as COPCs.
1 - Background criteria as described in Section 4.
2 - For duplicate pairs, the average chemical concentrations of the original and duplicate samples were compared to the site background criteria.
3 - Rationale Codes:
Above Screening Levels (ASL)
Toxicity information not available (NTX)
Maximum detected concentration is below background screening criteria (BKG)
Below Screening Levels (BSL)
Essential Nutrient (NUT)
Bioaccumulative chemical (BIO)
Persistent, Bioaccumulative, and Toxic chemical (PBT)
4 - Value is based on Total PCBs.
5 - Value is based on estimated effects on microorganisms.
6 - The maximum concentration is greater than the site background criteria although the average concentration is less than the criteria.

Sources of Screening Levels and Hierarchy for Selection:
a - Preliminary Remediation Goals from Efroymson et al. (1997a)
b - Efroymson et al. (1997b) Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes
c - Efroymson et al. (1997c) Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants
d - Ecological Data Quality Level (USEPA Region 5, 1999)

COPC = Chemical of Potential Concern COPEC = Chemical of Potential Ecological Concern ERA = Ecological Risk Assessment HQ = Hazard Quotient USEPA = U.S. Environmental Protection Agency

Table H-2. Historical ERA COPEC Screen for Sediment at Load Line 6

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Site Background Criteria[1]	Detects > Site Background Criteria[2]	Ohio Sediment Reference Value (SRV)	Max Conc > Bkg Conc and Ohio SRV	Sediment Screening Level		HQ	Selected as a COPC?	Rationale[3]
											Value	Source			
Semivolatile Organics (µg/kg)															
2-METHYLNAPHTHALENE	1/2	9.9 J	15 J	6.7	12.5	LL6SD-010-0001-SD-D	NA	NA	NA	NA	20.2	b	0.74	NO	BSL
BENZO(A)ANTHRACENE	2/2	5.2 J	30 J	17.1	17.1	LL6SD-010-0001-SD-D	NA	NA	NA	NA	108	a	0.28	NO	BSL
BENZO(A)PYRENE	2/2	6.2 J	38 J	20.1	20.1	LL6SD-010-0001-SD-D	NA	NA	NA	NA	150	a	0.25	NO	BSL
BENZO(B)FLUORANTHENE	2/2	5.8 J	44 J	22.4	22.4	LL6SD-010-0001-SD-D	NA	NA	NA	NA	10,400	b	0.004	NO	BSL
BENZO(G,H,I)PERYLENE	1/2	26 J	30 J	14.6	28	LL6SD-010-0001-SD-D	NA	NA	NA	NA	170	b	0.18	NO	BSL
BENZO(K)FLUORANTHENE	1/2	33 J	45 J	20.4	39	LL6SD-010-0001-SD-D	NA	NA	NA	NA	240	b	0.19	NO	BSL
BIS(2-ETHYLHEXYL)PHTHALATE	1/2	36 J	36 J	13.6	21.3	LL6SD-010-0001-SD-D	NA	NA	NA	NA	182	b	0.20	NO	BSL
CHRYSENE	2/2	8.1 J	48	24.8	24.8	LL6SD-010-0001-SD-D	NA	NA	NA	NA	166	a	0.29	NO	BSL
DIBENZO(A,H)ANTHRACENE	1/2	9.4 J	9.4 J	3.4	5.45	LL6SD-010-0001-SD-D	NA	NA	NA	NA	33	a	0.28	NO	BSL
FLUORANTHENE	2/2	14 J	74	38.8	38.8	LL6SD-010-0001-SD-D	NA	NA	NA	NA	423	a	0.17	NO	BSL
INDENO(1,2,3-CD)PYRENE	2/2	4.3 J	28 J	14.7	14.7	LL6SD-010-0001-SD-D	NA	NA	NA	NA	200	b	0.14	NO	BSL
NAPHTHALENE	1/2	13 J	13 J	4.06	7.08	LL6SD-010-0001-SD-D	NA	NA	NA	NA	176	a	0.07	NO	BSL
PHENANTHRENE	1/2	25 J	33 J	14.8	29	LL6SD-010-0001-SD-D	NA	NA	NA	NA	204	a	0.16	NO	BSL
PYRENE	2/2	11 J	58	29.8	29.8	LL6SD-010-0001-SD-D	NA	NA	NA	NA	195	a	0.30	NO	BSL
Pesticides PCBs (µg/kg)															
4,4'-DDE	1/2	1.5 J	2.4	1.18	1.95	LL6SD-010-0001-SD	NA	NA	NA	NA	3.16	a[4]	0.76	NO	BSL
AROCLOR-1260	1/2	6.5 J	9.6 J	4.45	8.05	LL6SD-010-0001-SD	NA	NA	NA	NA	59.8	a[5]	0.16	NO	BSL
Inorganics (mg/kg)															
ALUMINUM	9/9	4500	16200	10617	10617	LL6SD-001-0001-SD	13900	1/9	29000	NO	NA	NA	NA	NO	BKG
ANTIMONY	1/9	0.6	0.6	0.347	0.6	LL6SD-001-0001-SD	NA	NA	1.3	NO	NA	NA	NA	NO	BKG
ARSENIC	9/9	6.8	37	14.1	14.1	LL6SD-004-0001-SD	19.5	1/9	25	YES	9.79	a	3.78	**YES**	ASL
BARIUM	9/9	30	95	72.4	72.4	LL6SD-004-0001-SD	123	0/9	190	NO	NA	NA	NA	NO	BKG
BERYLLIUM	9/9	0.41 B	0.82	0.595	0.595	LL6SD-014-0001-SD	0.38	9/9	0.8	YES	NA	NA	NA	**YES**	NTX
CADMIUM	5/9	0.1 B	1.1	0.349	0.559	LL6SD-004-0001-SD	NA	NA	0.79	YES	0.99	a	1.11	**YES**	ASL
CALCIUM	9/9	620	22000	4698	4698	LL6SD-010-0001-SD-D	5510	1/9	21000	YES	NA	NA	NA	NO	NUT
CHROMIUM	9/9	9.1	23.2	16	16	LL6SD-001-0001-SD	18.1	2/9	29	NO	43.4	a	0.53	NO	BKG,BSL
COBALT	9/9	6.3	15	9.40	9.40	LL6SD-003-0001-SD	9.1	5/9	12	YES	50	b	0.30	NO	BSL
COPPER	9/9	13	97	38.3	38.3	LL6SD-014-0001-SD	27.6	3/9	32	YES	31.6	a	3.07	**YES**	ASL
IRON	9/9	16000 H	27500 H	22111	22111	LL6SD-001-0001-SD	28200	0/9	41000	NO	NA	NA	NA	NO	BKG
LEAD	9/9	11	156	51.3	51.3	LL6SD-001-0001-SD	27.4	6/9	47	YES	35.8	a	4.36	**YES**	ASL
MAGNESIUM	9/9	670	3880	2611	2611	LL6SD-001-0001-SD	2760	4/9	7100	NO	NA	NA	NA	NO	NUT
MANGANESE	9/9	240	770	409	409	LL6SD-003-0001-SD	1950	0/9	1500	NO	NA	NA	NA	NO	BKG
MERCURY	9/9	0.014 B	0.25	0.0757	0.0757	LL6SD-015-0001-SD	0.06	3/9	0.12	YES	0.18	a	1.39	**YES**	ASL
NICKEL	9/9	12	31	19.8	19.8	LL6SD-010-0001-SD and Dup	17.7	5/9	33	NO	22.7	a	1.37	NO	BKG
POTASSIUM	9/9	400	1820	1116	1116	LL6SD-001-0001-SD	1950	0/9	6800	NO	NA	NA	NA	NO	NUT
SELENIUM	4/9	0.66 B	1.3 B	0.594	0.823	LL6SD-004-0001-SD	1.7	0/9	1.7	NO	NA	NA	NA	NO	BKG
SODIUM	1/9	243	243	82.4	243	LL6SD-001-0001-SD	112	1/9	NA	YES	NA	NA	NA	NO	NUT
VANADIUM	9/9	13	27.2	19.3	19.3	LL6SD-001-0001-SD	26.1	1/9	40	NO	NA	NA	NA	NO	BKG
ZINC	9/9	49	450	142	142	LL6SD-004-0001-SD	532	0/9	160	NO	121	a	3.72	NO	BKG
Miscellaneous Parameters															
NITROCELLULOSE (µg/kg)	2/2	1500	2200	1900	1900	LL6SD-003-0001-SD	NA	NA	NA	NA	NA	NA	NA	**YES**	NTX
TOTAL ORGANIC CARBON (mg/kg)	8/8	3900	27000	11300	11300	LL6SD-004-0001-SD	NA	NA	NA	NA	NA	NA	NA	NO	NA

Notes:

Shaded cells are chemicals that are retained as COPCs.

1 - Background criteria as described in Section 4.

2 - For duplicate pairs, the average chemical concentrations of the original and duplicate samples were compared to the site background criteria.

3 - Rationale Codes:

Above Screening Level (ASL)

Toxicity information not available (NTX)

Maximum detected concentration is less than the site background criteria or Ohio Sediment Reference Value (BKG)

Below Screening Level (BSL)

Essential Nutrient (NUT)

4 - Value is based on sum DDE.

5 - Value is based on total PCBs.

Sources of Screening Levels and Hierarchy for Selection:

a - Threshold Effects Concentration from MacDonald et al. (2000)

b - Ecological Data Quality Level (USEPA Region 5, 1999)

COPC = Chemical of Potential Concern COPEC = Chemical of Potential Ecological Concern HQ = Hazard Quotient PCB = Polychlorinated Biphenyl USEPA = U.S. Environmental Protection Agency

Table H-3. Historical ERA COPEC Screen for Surface Water at Load Line 6

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Site Background Criteria[1]	Detects > Site Background Criteria[2]	Max Conc > Bkg Conc	Surface Water Screening Level		HQ	Selected as a COPC?	Rationale[3]
										Value	Source			
Volatile Organics (µg/L)														
ACETONE	1/1	2.2	8.2	5.2	5.2	LL6SW-002-0001-SW-D	NA	NA	NA	NA	NA	NA	YES	NTX
Semivolatile Organics (µg/L)														
4-METHYLPHENOL	1/1	0.26 J	0.36 J	0.31	0.31	LL6SW-002-0001-SW-D	NA	NA	NA	480[4]	a	0.001	NO	BSL
Inorganics (µg/L)														
ALUMINUM	5/5	97.2 B	16000	5091	5091	LL6SW-004-0001-SW	3370	2/5	YES	87	b	184	YES	ASL
ARSENIC	3/5	1.6 B	26	7.83	11.9	LL6SW-004-0001-SW	3.2	2/5	YES	340[5]	a	0.08	NO	BSL
BARIUM	5/5	15.2	230	78.3	78.3	LL6SW-004-0001-SW	47.5	3/5	YES	2000[4]	a	0.12	NO	BSL
BERYLLIUM	2/5	0.31 B	0.8 B	0.656	0.555	LL6SW-004-0001-SW	NA	NA	NA	18[4,6]	a	0.044	NO	BSL
CADMIUM	1/5	1.1 B	1.1 B	0.552	1.1	LL6SW-004-0001-SW	NA	NA	NA	1.35[4,5,6]	a	0.81	NO	BSL
CALCIUM	5/5	11000 H	72000	42390	42390	LL6SW-002-0001-SW	41400	3/5	YES	NA	NA	NA	NO	NUT
CHROMIUM	3/5	1.6 B	23	8.1	11.6	LL6SW-004-0001-SW	NA	NA	NA	247[4,5,6]	a	0.09	NO	BSL
COBALT	3/5	1.1 B	22	5.94	8.9	LL6SW-004-0001-SW	NA	NA	NA	220[4]	a	0.10	NO	BSL
COPPER	4/5	3.6 B	31	11.8	13.6	LL6SW-004-0001-SW	7.9	2/5	YES	5.15[4,5,6]	a	6.02	YES	ASL
IRON	5/5	1000	38000	10725	10725	LL6SW-004-0001-SW	2560	2/5	YES	1000	b	38	YES	ASL
LEAD	4/5	0.96 B	83	23.1	28.6	LL6SW-004-0001-SW	NA	NA	NA	26[4,5,6]	a	3.19	YES	ASL
MAGNESIUM	5/5	2100	8800	6224	6224	LL6SW-004-0001-SW	10800	0/5	NO	NA	NA	NA	NO	NUT
MANGANESE	5/5	62	11000	2746	2746	LL6SW-004-0001-SW	391	2/5	YES	NA	NA	NA	YES	NTX
MERCURY	2/5	0.072 B	0.12 B	0.0682	0.096	LL6SW-004-0001-SW	NA	NA	NA	1.4[5]	a	0.09	NO	BSL
NICKEL	2/5	12	25	8.78	18.5	LL6SW-004-0001-SW	NA	NA	NA	198[4,5,6]	a	0.13	NO	BSL
POTASSIUM	5/5	2100	5500	3505	3505	LL6SW-005-0001-SW	3170	2/5	YES	NA	NA	NA	NO	NUT
SELENIUM	1/5	7.2	7.2	3.94	7.2	LL6SW-004-0001-SW	NA	NA	NA	5[7]	a	1.44	YES	ASL
SODIUM	5/5	530 B	3200	1627	1627	LL6SW-004-0001-SW	21300	0/5	NO	NA	NA	NA	NO	NUT
VANADIUM	2/5	14	28	9.32	21	LL6SW-004-0001-SW	NA	NA	NA	150[4]	a	0.19	NO	BSL
ZINC	5/5	4.7 B	430	106	106	LL6SW-004-0001-SW	42	2/5	YES	49[4,5,6]	a	8.78	YES	ASL
Miscellaneous Parameters (mg/L)														
NITROCELLULOSE	1/1	0.1	0.1	0.05	0.05	LL6SW-002-0001-SW-D	NA	NA	NA	NA	NA	NA	YES	NTX

Notes:
Shaded cells are chemicals that are retained as COPCs.
1 - Background criteria as described in Section 4.
2 - For duplicate pairs, the average chemical concentrations of the original and duplicate samples were compared to the site background criteria.
3 - Rationale Codes:
Above Screening Level (ASL)
Below Screening Level (BSL)
Essential Nutrient (NUT)
Toxicity information not available (NTX)
Persistent, Bioaccumulative, and Toxic chemical (PBT)
4 - Outside Mixing Zone Maximum value.
5 - Dissolved criteria.
6 - Based on a calculated water hardness of 36.1 mg/L (in order to be most conservative, the minimum hardness at location LL6SW-003 was used).
7 - Outside Mixing Zone Average value. An Outside Mixing Zone Maximum value is not available.

Sources of Screening Levels and Hierarchy for Selection:
a - Ohio Water Quality Criteria
b - USEPA Recommended Water Quality Criteria

COPC = Chemical of Potential Concern
COPEC = Chemical of Potential Ecological Concern
HQ = Hazard Quotient
USEPA = U.S. Environmental Protection Agency

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Table H-4. Checklist of Important Ecological Places and Resources at Load Line 6

Resource	Army (2005)	Ohio EPA (2008)	Load Line 6	
			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	

Table H-4. Checklist of Important Ecological Places and Resources at Load Line 6 (continued)

Resource	Army (2005)	Ohio EPA (2008)	Load Line 6	
			Absent	Present
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
Federal- 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: Unit 1 – mixed valuable communities, Unit 2 – Wadsworth Glen, Unit 3 – mixed mature woods, Unit 4 – mixed swamp forest, and Unit 5 – oak/maple swamp forest. Also, OHARNG recognizes the importance of federal- and state-listed threatened and endangered plant and animal species.

OAC = Ohio Administrative Code

Ohio EPA = Ohio Environmental Protection Agency

X = Designated as important

Table H-5. Natural Resources Management Goals (OHARNG 2014)

Goals and Objectives of Ohio Army National Guard	Comments on Goals Relative to HTRW Work at Former 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 Camp Ravenna and their part in ensuring sustainable use of the site in perpetuity.	The U.S. Army is 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 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 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-5. Natural Resources Management Goals (OHARNG 2014) (continued)

Goals and Objectives of Ohio Army National Guard	Comments on Goals Relative to HTRW Work at Former 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 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 that 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 ODNR 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 to properly manage and maintain wildlife populations and resources.
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.

Table H-5. Natural Resources Management Goals (OHARNG 2014) (continued)

Goals and Objectives of Ohio Army National Guard	Comments on Goals Relative to HTRW Work at Former RVAAP
Goal 8. Manage forest resources to the benefit of the military mission, to perpetuate the ecosystem functions, 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 U.S. 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 protect water quality and ecological functions while facilitating the military mission. Objective 9.1: Avoid wetland fills. Objective 9.2: 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 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-5. Natural Resources Management Goals (OHARNG 2014) (continued)

Goals and Objectives of Ohio Army National Guard	Comments on Goals Relative to HTRW Work at Former RVAAP
Goal 11. Manage cultural resources on 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 also are 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 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 are collected and managed by OHARNG. These data may be utilized during restoration activities 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
PLS = Planning Level Survey (Wetland)
RVAAP = Ravenna Army Ammunition Plant

Table H-6. 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-7. 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
Metals									
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
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

Table H-7. 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
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
Sulfide	18496-25-8	--	--	--	--	0.00358	USEPA Reg 5	3.58E-03	USEPA Reg 5
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
Zinc	7440-66-6	46	avian EcoSSL for Zn	8.5	PRGs	6.62	USEPA Reg 5	4.60E+01	avian EcoSSL for Zn
Organic Compounds									
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

Table H-7. 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
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
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
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

Table H-7. 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-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
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

Table H-7. 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-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
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

Table H-7. 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-Dichloroethene	540-59-0	--	--	--	--	0.784	USEPA Reg 5 (for trans form)	7.84E-01	USEPA Reg 5 (for trans form)
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
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

Table H-7. 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
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
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

Table H-7. 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
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
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

Table H-7. 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
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
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

Table H-7. 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
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
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

Table H-7. 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
2,4,5-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
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/
Ecological Screening Levels, U.S. Environmental Protection Agency (USEPA) Region 5, 2003: http://www.epa.gov/reg5rcra/ca/edql.htm
[a]U.S. 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 soil 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
EDQL = Ecological Data Quality Levels
EcoSSL = Ecological Soil Screening Level
ESL = Ecological Screening Level
Ohio EPA = Ohio Environmental Protection Agency
PRGs = Preliminary Remediation Goal
RDX = (cyclonite) Hexahydro-1,3,5-trinitro-1,3,5-triazine

Table H-8. Ecological Screening Values for Chemical Analytes in Sediment

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 ESLs (2003)[b] (update of 1998 EDQLs)		Preferred ESV[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
Metals							
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	-	--	--	--	--	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
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.
Organic Compounds							
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
Aniline	62-53-3	--	--	0.00031	USEPA Reg 5	3.10E-04	USEPA Reg 5

Table H-8. Ecological Screening Values for Chemical Analytes in Sediment (continued)

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 ESLs (2003)[b] (update of 1998 EDQLs)		Preferred ESV[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
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
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
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
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

Table H-8. Ecological Screening Values for Chemical Analytes in Sediment (continued)

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 ESLs (2003)[b] (update of 1998 EDQLs)		Preferred ESV[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
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
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

Table H-8. Ecological Screening Values for Chemical Analytes in Sediment (continued)

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 ESLs (2003)[b] (update of 1998 EDQLs)		Preferred ESV[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
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-butylphthalate	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
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

Table H-8. Ecological Screening Values for Chemical Analytes in Sediment (continued)

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 ESLs (2003)[b] (update of 1998 EDQLs)		Preferred ESV[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
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
Hexachlorophene	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	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 Metharcrylate	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
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

Table H-8. Ecological Screening Values for Chemical Analytes in Sediment (continued)

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 ESLs (2003)[b] (update of 1998 EDQLs)		Preferred ESV[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
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
PAH	130498-29-2	1.61	MacDonald et al.	--	--	1.61E+00	MacDonald et al.
PCBs	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	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
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

Table H-8. Ecological Screening Values for Chemical Analytes in Sediment (continued)

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Region 5 ESLs (2003)[b] (update of 1998 EDQLs)		Preferred ESV[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
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 2000. "Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems." *Archives of Environmental Contamination and Toxicology* **39**:20–31.

[b]ESLs, USEPA Region 5, 2003 found at: http://www.epa.gov/reg5rcra/ca/edql.htm.

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

MacDonald et al. = consensus-based toxicity equivalent concentration.

-- = No value

CAS = Chemical Abstract Service

EDQL = Ecological Data Quality Level

ESL = Ecological Screening Level

ESV = Ecological Screening Value

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

PAH = Polycyclic Aromatic Hydrocarbon

PCB = Polychlorinated Biphenyl

RDX = (cyclonite) Hexahydro-1,3,5-trinitro-1,3,5-triazine

USEPA = U.S. Environmental Protection Agency

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Table H-9. 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)[c] (update of 1998 EDQLs)		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)
Molybdenum	7439-98-7	190,000	20,000	--	--	370	Tier II (Suter & Tsao 1996)	--	--	1.90E+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

Table H-9. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

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)[c] (update of 1998 EDQLs)		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
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 Compounds											
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)
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

Table H-9. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

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)[c] (update of 1998 EDQLs)		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
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-05	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
7,12'-Dimethylbenz(a)anthracene	57-97-6	--	--	--	--	--	--	0.548	USEPA Reg 5	5.48E-01	USEPA Reg 5

Table H-9. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

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)[c] (update of 1998 EDQLs)		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
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

Table H-9. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

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)[c] (update of 1998 EDQLs)		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
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
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
Nitrocellulose	9004-70-0	--	--	--	--	--	--	--	--	No ESV	No Source
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

Table H-9. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

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)[c] (update of 1998 EDQLs)		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
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
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
Vinyl acetate	108-05-4	--	--	--	--	--	--	248	USEPA Reg 5	2.48E+02	USEPA Reg 5

Table H-9. Ecological Screening Values for Chemical Analytes in Surface Water (continued)

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)[c] (update of 1998 EDQLs)		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
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 [acenaphthylene, 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; 100 mg/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]USEPA 2003. Ecological Screening Levels (ESLs). Formerly 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 (Ohio EPA 1999), Suter and Tsao 1996 (NAWQC followed by Tier II), and EDQLs from Region 5 (USEPA 2003). For comparisons of MDCs to ESVs, the OMZM is the preferred value. For comparisons of average concentrations to ESVs, the OMZA is the preferred value. In the absence of either OMZM values 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
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 here: http://www.epa.gov/waterscience/criteria/copper/2007/criteria-full.pdf
NAWQC 2009 value for methyl tert-butyl ether can be found here: http://www.epa.gov/waterscience/criteria/mtbe/#findings
CAS = Chemical Abstract Service
EDQL = Ecological Data Quality Level
Ohio EPA = Ohio Environmental Protection Agency
USEPA = U.S. Environmental Protection Agency

Table H-10. SRC and Integrated COPEC Screening with Maximum Ratio for Deep Surface Soil (0-4 ft bgs Discrete Samples) at Load Line 6 Former Production Area

Analyte (mg/kg)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]		PBT[b] Chemical? (yes/no)	SRC?[c] (yes/no)	SRC Justification	ESV	ESV Source[d]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
						Surface	Subsurface								
Metals															
Aluminum	7429-90-5	73/ 73	1990	19000	12000	17700	19500	No	No	Below background	50	PRGs	No	Below background	380
Antimony	7440-36-0	10/ 72	0.085	0.3	0.232	0.96	0.96	No	No	Below background	0.27	EcoSSL	No	Below background	1.11
Arsenic	**7440-38-2**	**73/ 73**	**2.6**	**41**	**12.1**	**15.4**	**19.8**	**No**	**Yes**	**Exceeds background**	**18**	**EcoSSL**	**Yes**	**Exceeds ESV**	**2.28**
Barium	7440-39-3	73/ 73	30	153	75.8	88.4	124	No	Yes	Exceeds background	330	EcoSSL	No	Below ESV	0.46
Beryllium	7440-41-7	73/ 73	0.2	1.3	0.614	0.88	0.88	No	Yes	Exceeds background	21	EcoSSL	No	Below ESV	0.06
Cadmium	**7440-43-9**	**18/ 73**	**0.039**	**6.8**	**0.235**	**0**	**0**	**No**	**Yes**	**Exceeds background**	**0.36**	**EcoSSL**	**Yes**	**Exceeds ESV**	**18.89**
Calcium	7440-70-2	73/ 73	410	184000	12800	15800	35500	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	**7440-47-3**	**73/ 73**	**5.8**	**29**	**16.6**	**17.4**	**27.2**	**No**	**Yes**	**Exceeds background**	**26**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.12**
Cobalt	**7440-48-4**	**73/ 73**	**2.3**	**33**	**9.75**	**10.4**	**23.2**	**No**	**Yes**	**Exceeds background**	**13**	**EcoSSL**	**Yes**	**Exceeds ESV**	**2.54**
Copper	**7440-50-8**	**73/ 73**	**5.2**	**627**	**29.5**	**17.7**	**32.3**	**No**	**Yes**	**Exceeds background**	**28**	**EcoSSL**	**Yes**	**Exceeds ESV**	**22.39**
Iron	7439-89-6	73/ 73	9940	40200	23800	23100	35200	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	**7439-92-1**	**73/ 73**	**8.1**	**180**	**30**	**26.1**	**19.1**	**No**	**Yes**	**Exceeds background**	**11**	**EcoSSL**	**Yes**	**Exceeds ESV**	**16.36**
Magnesium	7439-95-4	73/ 73	787	8500	3470	3030	8790	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**73/ 73**	**45**	**1820**	**427**	**1450**	**3030**	**No**	**Yes**	**Exceeds background**	**220**	**EcoSSL**	**Yes**	**Exceeds ESV**	**8.27**
Mercury	**7439-97-6**	**66/ 73**	**0.011**	**0.6**	**0.0467**	**0.036**	**0.044**	**Yes**	**Yes**	**Exceeds background**	**0.00051**	**PRGs**	**Yes**	**Exceeds ESV**	**1176.47**
Nickel	**7440-02-0**	**73/ 73**	**8**	**46.6**	**21.3**	**21.1**	**60.7**	**No**	**Yes**	**Exceeds background**	**38**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.23**
Potassium	7440-09-7	73/ 73	430	2800	1300	927	3350	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	**7782-49-2**	**30/ 73**	**0.45**	**1.8**	**0.503**	**1.4**	**1.5**	**No**	**Yes**	**Exceeds background**	**0.52**	**EcoSSL**	**Yes**	**Exceeds ESV**	**3.46**
Silver	7440-22-4	4/ 73	0.018	0.034	0.157	0	0	No	Yes	Exceeds background	4.2	EcoSSL	No	Below ESV	0.01
Sodium	7440-23-5	33/ 73	26.6	1800	360	123	145	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	15/ 73	0.15	0.33	0.19	0	0.91	No	Yes	Exceeds background	1	PRGs	No	Below ESV	0.33
Vanadium	7440-62-2	73/ 73	5.6	32	20.6	31.1	37.6	No	No	Below background	7.8	EcoSSL	No	Below background	4.10
Zinc	**7440-66-6**	**73/ 73**	**29**	**200**	**70.4**	**61.8**	**93.3**	**No**	**Yes**	**Exceeds background**	**46**	**EcoSSL**	**Yes**	**Exceeds ESV**	**4.35**
Explosives															
HMX	**2691-41-0**	**1/ 27**	**0.19**	**0.19**	**0.0935**	**0**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Nitrocellulose	**9004-70-0**	**11/ 14**	**0.72**	**10.1**	**2.45**	**0**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds															
2-Methylnaphthalene	91-57-6	2/ 14	0.0099	0.022	0.0457	0	0	No	Yes	Detected organic	3.24	USEPA Reg 5	No	Below ESV	0.01
Acenaphthene	83-32-9	2/ 22	0.0046	0.069	0.00933	0	0	No	Yes	Detected organic	20	PRGs	No	Below ESV	0.003
Anthracene	120-12-7	3/ 22	0.0092	0.13	0.0128	0	0	No	Yes	Detected organic	1480	USEPA Reg 5	No	Below ESV	8.78E-05
Benz(a)anthracene	56-55-3	11/ 22	0.0049	0.29	0.0269	0	0	No	Yes	Detected organic	5.21	USEPA Reg 5	No	Below ESV	0.06
Benzo(a)pyrene	50-32-8	10/ 22	0.0037	0.2	0.0222	0	0	No	Yes	Detected organic	1.52	USEPA Reg 5	No	Below ESV	0.13
Benzo(b)fluoranthene	205-99-2	11/ 22	0.004	0.23	0.0269	0	0	No	Yes	Detected organic	59.8	USEPA Reg 5	No	Below ESV	0.004
Benzo(ghi)perylene	191-24-2	9/ 22	0.0065	0.083	0.0139	0	0	No	Yes	Detected organic	119	USEPA Reg 5	No	Below ESV	0.001
Benzo(k)fluoranthene	207-08-9	7/ 22	0.0042	0.16	0.0172	0	0	No	Yes	Detected organic	148	USEPA Reg 5	No	Below ESV	0.001
Bis(2-ethylhexyl)phthalate	117-81-7	7/ 14	0.016	0.16	0.0759	0	0	No	Yes	Detected organic	0.925	USEPA Reg 5	No	Below ESV	0.17
Carbazole	**86-74-8**	**1/ 14**	**0.14**	**0.14**	**0.0316**	**0**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Chrysene	218-01-9	11/ 22	0.0047	0.3	0.0283	0	0	No	Yes	Detected organic	4.73	USEPA Reg 5	No	Below ESV	0.06
Dibenz(a,h)anthracene	53-70-3	3/ 22	0.013	0.052	0.0104	0	0	No	Yes	Detected organic	18.4	USEPA Reg 5	No	Below ESV	0.003
Dibenzofuran	**132-64-9**	**1/ 14**	**0.045**	**0.045**	**0.0472**	**0**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Fluoranthene	206-44-0	12/ 22	0.0068	0.76	0.0617	0	0	No	Yes	Detected organic	122	USEPA Reg 5	No	Below ESV	0.01
Fluorene	86-73-7	1/ 22	0.057	0.057	0.00868	0	0	No	No	<5% Detected	30	PRGs	No	Below ESV	0.002
Indeno(1,2,3-cd)pyrene	193-39-5	6/ 22	0.015	0.088	0.0135	0	0	No	Yes	Detected organic	109	USEPA Reg 5	No	Below ESV	0.001

Table H-10. SRC and Integrated COPEC Screening with Maximum Ratio for Deep Surface Soil (0-4 ft bgs Discrete Samples) at Load Line 6 Former Production Area (continued)

Analyte (mg/kg)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]		PBT[b] Chemical? (yes/no)	SRC?[c] (yes/no)	SRC Justification	ESV	ESV Source[d]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
						Surface	Subsurface								
Naphthalene	91-20-3	1/ 22	0.078	0.078	0.00966	0	0	No	No	<5% Detected	0.0994	USEPA Reg 5	No	Below ESV	0.78
Phenanthrene	85-01-8	10/ 22	0.0077	0.51	0.0365	0	0	No	Yes	Detected organic	45.7	USEPA Reg 5	No	Below ESV	0.01
Pyrene	129-00-0	12/ 22	0.005	0.51	0.0441	0	0	No	Yes	Detected organic	78.5	USEPA Reg 5	No	Below ESV	0.01
Pesticides/PCBs															
4,4'-DDE	**72-55-9**	**1/ 14**	**0.0024**	**0.0024**	**0.000741**	**0**	**0**	**Yes**	**Yes**	**Detected organic**	**0.021**	**EcoSSL**	**Yes**	**PBT chemical**	**0.11**
PCB-1254	**11097-69-1**	**1/ 14**	**0.033**	**0.033**	**0.0075**	**0**	**0**	**Yes**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
PCB-1260	**11096-82-5**	**1/ 14**	**0.0096**	**0.0096**	**0.00556**	**0**	**0**	**Yes**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Volatile Organic Compounds															
Methylene chloride	75-09-2	1/ 14	0.002	0.002	0.00179	0	0	No	Yes	Detected organic	4.05	USEPA Reg 5	No	Below ESV	4.94E-04
Toluene	108-88-3	1/ 14	0.00035	0.00035	0.000964	0	0	No	Yes	Detected organic	200	PRGs	No	Below ESV	1.75E-06

[a]Background criteria for surface (0-1 ft bgs) and subsurface (>1 ft bgs) soil from 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 chemicals 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]For deep surface soil, an SRC is determined by depth. All raw data are compared to the applicable background criteria. If any sample starting at the surface (0 ft bgs) exceeds the surface background criteria, the chemical becomes an SRC. Additionally, if any subsurface (>0-4 ft bgs) sample exceeds the subsurface background criteria, it becomes an SRC.
[d]Screening Level Source: See soil ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is EcoSSLs, followed by DOE (1997a) *Preliminary Remediation Goals for Ecological Endpoints*. ES/ER/TM-162/R2, followed by Region 5 ESLs.
bgs = Below Ground Surface
CAS = Chemical Abstract Service
COPEC = Chemical of Potential Ecological Concern
DOE = U.S. Department of Energy
EcoSSL = Ecological Soil Screening Level
ESL = Ecological Screening Level
ESV = Ecological Screening Value
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
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 = U.S. Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-11. SRC and Integrated COPEC Screening with Maximum Ratio for Deep Surface Soil (0-4 ft bgs Discrete Samples) at Load Line 6 Non-Production Area

Analyte (mg/kg)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]		PBT[b] Chemical? (yes/no)	SRC?[c] (yes/no)	SRC Justification	ESV	ESV Source[d]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
						Surface	Subsurface								
Metals															
Aluminum	**7429-90-5**	**23/ 23**	**3300**	**19000**	**14000**	**17700**	**19500**	**No**	**Yes**	**Exceeds background**	**50**	**PRGs**	**Yes**	**Exceeds ESV**	**380**
Antimony	7440-36-0	4/ 21	0.077	0.62	0.264	0.96	0.96	No	No	Below background	0.27	EcoSSL	No	Below background	2.30
Arsenic	**7440-38-2**	**23/ 23**	**2.2**	**31.1**	**11.5**	**15.4**	**19.8**	**No**	**Yes**	**Exceeds background**	**18**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.73**
Barium	7440-39-3	23/ 23	42	180	79.6	88.4	124	No	Yes	Exceeds background	330	EcoSSL	No	Below ESV	0.55
Beryllium	7440-41-7	23/ 23	0.2	2.1	0.706	0.88	0.88	No	Yes	Exceeds background	21	EcoSSL	No	Below ESV	0.10
Cadmium	**7440-43-9**	**4/ 23**	**0.056**	**2.4**	**0.157**	**0**	**0**	**No**	**Yes**	**Exceeds background**	**0.36**	**EcoSSL**	**Yes**	**Exceeds ESV**	**6.67**
Calcium	7440-70-2	23/ 23	140	57000	6360	15800	35500	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	**7440-47-3**	**23/ 23**	**5.7**	**26.7**	**17.3**	**17.4**	**27.2**	**No**	**Yes**	**Exceeds background**	**26**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.03**
Cobalt	**7440-48-4**	**23/ 23**	**3.6**	**17.5**	**8.4**	**10.4**	**23.2**	**No**	**Yes**	**Exceeds background**	**13**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.35**
Copper	**7440-50-8**	**23/ 23**	**5.9**	**85.4**	**17**	**17.7**	**32.3**	**No**	**Yes**	**Exceeds background**	**28**	**EcoSSL**	**Yes**	**Exceeds ESV**	**3.05**
Iron	7439-89-6	23/ 23	10000	45000	24800	23100	35200	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	**7439-92-1**	**23/ 23**	**9.5**	**117**	**19.9**	**26.1**	**19.1**	**No**	**Yes**	**Exceeds background**	**11**	**EcoSSL**	**Yes**	**Exceeds ESV**	**10.64**
Magnesium	7439-95-4	23/ 23	910	8800	2970	3030	8790	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**23/ 23**	**120**	**1800**	**519**	**1450**	**3030**	**No**	**Yes**	**Exceeds background**	**220**	**EcoSSL**	**Yes**	**Exceeds ESV**	**8.18**
Mercury	**7439-97-6**	**19/ 23**	**0.0081**	**0.14**	**0.0351**	**0.036**	**0.044**	**Yes**	**Yes**	**Exceeds background**	**0.00051**	**PRGs**	**Yes**	**Exceeds ESV**	**274.51**
Nickel	7440-02-0	23/ 23	8.4	36.7	17.2	21.1	60.7	No	Yes	Exceeds background	38	EcoSSL	No	Below ESV	0.97
Potassium	7440-09-7	23/ 23	475	1840	1160	927	3350	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	**7782-49-2**	**16/ 23**	**0.65**	**2.5**	**1.04**	**1.4**	**1.5**	**No**	**Yes**	**Exceeds background**	**0.52**	**EcoSSL**	**Yes**	**Exceeds ESV**	**4.81**
Silver	7440-22-4	3/ 23	0.019	0.3	0.159	0	0	No	Yes	Exceeds background	4.2	EcoSSL	No	Below ESV	0.07
Sodium	7440-23-5	8/ 23	28.4	1400	281	123	145	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	5/ 23	0.1	0.32	0.353	0	0.91	No	Yes	Exceeds background	1	PRGs	No	Below ESV	0.32
Vanadium	7440-62-2	23/ 23	6.7	31	23.7	31.1	37.6	No	No	Below background	7.8	EcoSSL	No	Below background	3.97
Zinc	**7440-66-6**	**23/ 23**	**33**	**641**	**78.8**	**61.8**	**93.3**	**No**	**Yes**	**Exceeds background**	**46**	**EcoSSL**	**Yes**	**Exceeds ESV**	**13.93**
Semi-volatile Organic Compounds															
Anthracene	120-12-7	1/ 5	0.015	0.015	0.00572	0	0	No	Yes	Detected organic	1480	USEPA Reg 5	No	Below ESV	1.01E-05
Benz(a)anthracene	56-55-3	1/ 5	0.072	0.072	0.0171	0	0	No	Yes	Detected organic	5.21	USEPA Reg 5	No	Below ESV	0.01
Benzo(a)pyrene	50-32-8	1/ 5	0.055	0.055	0.0139	0	0	No	Yes	Detected organic	1.52	USEPA Reg 5	No	Below ESV	0.04
Benzo(b)fluoranthene	205-99-2	1/ 5	0.078	0.078	0.0185	0	0	No	Yes	Detected organic	59.8	USEPA Reg 5	No	Below ESV	0.001
Benzo(ghi)perylene	191-24-2	1/ 5	0.038	0.038	0.0104	0	0	No	Yes	Detected organic	119	USEPA Reg 5	No	Below ESV	3.19E-04
Benzo(k)fluoranthene	207-08-9	1/ 5	0.041	0.041	0.0111	0	0	No	Yes	Detected organic	148	USEPA Reg 5	No	Below ESV	2.77E-04
Chrysene	218-01-9	1/ 5	0.074	0.074	0.0176	0	0	No	Yes	Detected organic	4.73	USEPA Reg 5	No	Below ESV	0.02
Fluoranthene	206-44-0	1/ 5	0.14	0.14	0.0307	0	0	No	Yes	Detected organic	122	USEPA Reg 5	No	Below ESV	0.001
Indeno(1,2,3-cd)pyrene	193-39-5	1/ 5	0.029	0.029	0.00866	0	0	No	Yes	Detected organic	109	USEPA Reg 5	No	Below ESV	2.66E-04
Phenanthrene	85-01-8	1/ 5	0.054	0.054	0.0135	0	0	No	Yes	Detected organic	45.7	USEPA Reg 5	No	Below ESV	0.001
Pyrene	129-00-0	1/ 5	0.12	0.12	0.0269	0	0	No	Yes	Detected organic	78.5	USEPA Reg 5	No	Below ESV	0.002

[a]Background criteria for surface (0-1 ft bgs) and subsurface (>1 ft bgs) soil from 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 chemicals 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]For deep surface soil, an SRC is determined by depth. All raw data are compared to the applicable background criteria. If any sample starting at the surface (0 ft bgs) exceeds the surface background criteria, the chemical becomes an SRC. Additionally, if any subsurface (>0-4 ft bgs) sample exceeds the subsurface background criteria, it becomes an SRC.
[d]Screening Level Source: See soil ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is EcoSSLs, followed by DOE (1997a) *Preliminary Remediation Goals for Ecological Endpoints*. ES/ER/TM-162/R2, followed by Region 5 ESLs.

bgs = Below Ground Surface
CAS = Chemical Abstract Service
COPEC = Chemical of Potential Ecological Concern
DOE = U.S. Department of Energy
EcoSSL = Ecological Soil Screening Level
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ESV = Ecological Screening Value
Ohio EPA = Ohio Environmental Protection Agency
PBT = Persistent, Bioaccumulative, and Toxic
PRG = Preliminary Remediation Goal
RVAAP = Ravenna Army Ammunition Plant
SRC = Site-Related Contaminant
USEPA = U.S. Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-12. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment at the Load Line 6 Former Test Pond

Analyte (mg/kg)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Chemical? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Metals															
Aluminum	7429-90-5	1/ 1	13300	13300	13300	13900	29000	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Antimony	**7440-36-0**	**1/ 1**	**1.7**	**1.7**	**1.7**	**0**	**1.3**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Arsenic	7440-38-2	1/ 1	8.9	8.9	8.9	19.5	25	No	No	Below background	9.79	MacDonald et al.	No	Below background	0.91
Barium	7440-39-3	1/ 1	70.8	70.8	70.8	123	190	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Beryllium	7440-41-7	1/ 1	0.65	0.65	0.65	0.38	0.8	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Cadmium	7440-43-9	1/ 1	0.88	0.88	0.88	0	0.79	No	Yes	Exceeds background	0.99	MacDonald et al.	No	Below ESV	0.89
Calcium	7440-70-2	1/ 1	3710	3710	3710	5510	21000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	1/ 1	18	18	18	18.1	29	No	No	Below background	43.4	MacDonald et al.	No	Below background	0.41
Cobalt	7440-48-4	1/ 1	11.7	11.7	11.7	9.1	12	No	No	Below SRV	50	USEPA Reg 5	No	Below ESV	0.23
Copper	**7440-50-8**	**1/ 1**	**91.7**	**91.7**	**91.7**	**27.6**	**32**	**No**	**Yes**	**Exceeds background**	**31.6**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**2.90**
Iron	7439-89-6	1/ 1	23300	23300	23300	28200	41000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	**7439-92-1**	**1/ 1**	**55.2**	**55.2**	**55.2**	**27.4**	**47**	**No**	**Yes**	**Exceeds background**	**35.8**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.54**
Magnesium	7439-95-4	1/ 1	2970	2970	2970	2760	7100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	1/ 1	327	327	327	1950	1500	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Nickel	7440-02-0	1/ 1	22.8	22.8	22.8	17.7	33	No	No	Below SRV	22.7	MacDonald et al.	No	Below SRV	1.00
Potassium	7440-09-7	1/ 1	1670	1670	1670	1950	6800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	1/ 1	1.4	1.4	1.4	1.7	1.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Silver	7440-22-4	1/ 1	0.21	0.21	0.21	0	0.43	No	No	Below SRV	0.5	USEPA Reg 5	No	Below ESV	0.42
Sodium	7440-23-5	1/ 1	148	148	148	112	--	No	Yes	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Vanadium	7440-62-2	1/ 1	22.9	22.9	22.9	26.1	40	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Zinc	7440-66-6	1/ 1	93.1	93.1	93.1	532	160	No	No	Below background	121	MacDonald et al.	No	Below background	0.77
Explosives															
Tetryl	**479-45-8**	**1/ 1**	**0.031**	**0.031**	**0.031**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**

[a]Background criteria 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 chemicals 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 sediment ESV appendix 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*. Archives of Environmental Contamination and Toxicology 39, 20–31 (2000)], followed by Region 5 ESLs.

CAS = Chemical Abstract Service
COPEC = Chemical of Potential Ecological Concern
ESL = Ecological Screening Level
ESV = Ecological Screening Value
Ohio EPA = Ohio Environmental Protection Agency
PBT = Persistent, Bioaccumulative, and Toxic
RVAAP = Ravenna Army Ammunition Plant
SRC = Site-Related Contaminant
SRV = Sediment Reference Value
USEPA = U.S. Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-13. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment at the Load Line 6 Drainage Ditches

Analyte (mg/kg)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Chemical? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Metals															
Aluminum	7429-90-5	2/ 2	7610	9600	8610	13900	29000	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Antimony	7440-36-0	1/ 2	0.091	0.091	0.203	0	1.3	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Arsenic	7440-38-2	2/ 2	8.7	9.6	9.15	19.5	25	No	No	Below background	9.79	MacDonald et al.	No	Below background	0.98
Barium	7440-39-3	2/ 2	57.4	73	65.2	123	190	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Beryllium	7440-41-7	2/ 2	0.41	0.55	0.48	0.38	0.8	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Calcium	7440-70-2	2/ 2	852	4700	2780	5510	21000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	2/ 2	12.4	14	13.2	18.1	29	No	No	Below background	43.4	MacDonald et al.	No	Below background	0.32
Cobalt	7440-48-4	2/ 2	6.3	12.8	9.55	9.1	12	No	Yes	Exceeds background	50	USEPA Reg 5	No	Below ESV	0.26
Copper	7440-50-8	2/ 2	15	21	18	27.6	32	No	No	Below background	31.6	MacDonald et al.	No	Below background	0.66
Iron	7439-89-6	2/ 2	20000	28100	24100	28200	41000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	7439-92-1	2/ 2	14.8	36	25.4	27.4	47	No	No	Below SRV	35.8	MacDonald et al.	No	Below SRV	1.01
Magnesium	7439-95-4	2/ 2	2000	2140	2070	2760	7100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	2/ 2	380	776	578	1950	1500	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Mercury	**7439-97-6**	**2/ 2**	**0.039**	**0.052**	**0.0455**	**0.059**	**0.12**	**Yes**	**Yes**	**PBT chemical**	**0.18**	**MacDonald et al.**	**Yes**	**PBT chemical**	**0.29**
Nickel	7440-02-0	2/ 2	14	19	16.5	17.7	33	No	No	Below SRV	22.7	MacDonald et al.	No	Below ESV	0.84
Potassium	7440-09-7	2/ 2	881	1000	941	1950	6800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	1/ 2	0.97	0.97	0.655	1.7	1.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Sodium	7440-23-5	1/ 2	32.1	32.1	53.6	112	--	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	1/ 2	0.095	0.095	0.115	0.89	4.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Vanadium	7440-62-2	2/ 2	13.9	17	15.5	26.1	40	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Zinc	7440-66-6	2/ 2	68	72.9	70.5	532	160	No	No	Below background	121	MacDonald et al.	No	Below background	0.60

[a]Background criteria 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 chemicals 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 sediment ESV appendix 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*. Archives of Environmental Contamination and Toxicology 39, 20–31 (2000)], followed by Region 5 ESLs.

CAS = Chemical Abstract Service
COPEC = Chemical of Potential Ecological Concern
ESL = Ecological Screening Level
ESV = Ecological Screening Value
Ohio EPA = Ohio Environmental Protection Agency
PBT = Persistent, Bioaccumulative, and Toxic
RVAAP = Ravenna Army Ammunition Plant
SRC = Site-Related Contaminant
SRV = Sediment Reference Value
USEPA = U.S. Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-14. SRC and Integrated COPEC Screening with Maximum to OMZM Ratio for Surface Water at the Load Line 6 Former Test Pond

Analyte (mg/L)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	PBT[b] Chemical? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Metals														
Aluminum	7429-90-5	1/ 1	0.201	0.201	0.201	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	2.31
Antimony	7440-36-0	1/ 1	0.00029	0.00029	0.00029	0	No	Yes	Exceeds background	0.9	Ohio Administrative Code	No	Below ESV	3.22E-04
Arsenic	7440-38-2	1/ 1	0.00081	0.00081	0.00081	0.0032	No	No	Below background	0.34	Ohio Administrative Code	No	Below background	0.002
Barium	7440-39-3	1/ 1	0.0099	0.0099	0.0099	0.0475	No	No	Below background	2	Ohio Administrative Code	No	Below background	0.005
Calcium	7440-70-2	1/ 1	20.4	20.4	20.4	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Cobalt	7440-48-4	1/ 1	0.00009	0.00009	0.00009	0	No	Yes	Exceeds background	0.22	Ohio Administrative Code	No	Below ESV	4.09E-04
Copper	7440-50-8	1/ 1	0.0024	0.0024	0.0024	0.0079	No	No	Below background	0.014	Ohio Administrative Code[d]	No	Below background	0.17
Iron	7439-89-6	1/ 1	1.04	1.04	1.04	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	1.04
Lead	7439-92-1	1/ 1	0.00028	0.00028	0.00028	0	No	Yes	Exceeds background	0.12	Ohio Administrative Code[d]	No	Below ESV	0.002
Magnesium	7439-95-4	1/ 1	3.8	3.8	3.8	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	1/ 1	0.133	0.133	0.133	0.391	No	No	Below background	0.12	Tier II (Suter & Tsao 1996)	No	Below background	1.11
Potassium	7440-09-7	1/ 1	2.76	2.76	2.76	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Sodium	7440-23-5	1/ 1	0.582	0.582	0.582	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Explosives														
HMX	2691-41-0	1/ 1	0.000062	0.000062	0.000062	0	No	Yes	Exceeds background	1.2	Ohio Administrative Code	No	Below ESV	5.17E-05
Pesticides/PCBs														
beta-BHC	**319-85-7**	**1/ 1**	**0.000044**	**0.000044**	**0.000044**	**0**	**Yes**	**Yes**	**Exceeds background**	**0.000495**	**USEPA Reg 5**	**Yes**	**PBT chemical**	**0.09**

[a]Background criteria from 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 chemicals 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
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
NAWQC = National Ambient Water Quality Criteria
Ohio EPA = Ohio Environmental Protection Agency
PBT = Persistent, Bioaccumulative, and Toxic
PCB = Polychlorinated Biphenyl
RVAAP = Ravenna Army Ammunition Plant
SRC = Site-Related Contaminant
USEPA = U.S. Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-15. SRC and Integrated COPEC Screening with Maximum to OMZM Ratio for Surface Water at the Load Line 6 Drainage Ditches

Analyte (mg/L)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	PBT[b] Chemical? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Metals														
Aluminum	**7429-90-5**	**3/ 3**	**0.71**	**6.04**	**2.64**	**3.37**	**No**	**Yes**	**Exceeds background**	**0.087**	**NAWQC 2009**	**Yes**	**Exceeds ESV**	**69.43**
Antimony	7440-36-0	1/ 3	0.00026	0.00026	0.00129	0	No	Yes	Exceeds background	0.9	Ohio Administrative Code	No	Below ESV	2.89E-04
Arsenic	7440-38-2	3/ 3	0.00093	0.0032	0.00191	0.0032	No	No	Below background	0.34	Ohio Administrative Code	No	Below background	0.01
Barium	7440-39-3	3/ 3	0.0221	0.0667	0.0459	0.0475	No	Yes	Exceeds background	2	Ohio Administrative Code	No	Below ESV	0.03
Beryllium	7440-41-7	1/ 3	0.00042	0.00042	0.000335	0	No	Yes	Exceeds background	0.093	Ohio Administrative Code[d]	No	Below ESV	0.005
Cadmium	7440-43-9	2/ 3	0.00014	0.0004	0.000253	0	No	Yes	Exceeds background	0.0045	Ohio Administrative Code[d]	No	Below ESV	0.09
Calcium	7440-70-2	3/ 3	13.2	72	44.8	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	3/ 3	0.0023	0.007	0.00403	0	No	Yes	Exceeds background	1.8	Ohio Administrative Code[d]	No	Below ESV	0.004
Cobalt	7440-48-4	3/ 3	0.00026	0.0072	0.00285	0	No	Yes	Exceeds background	0.22	Ohio Administrative Code	No	Below ESV	0.03
Copper	7440-50-8	3/ 3	0.0032	0.0123	0.00657	0.0079	No	Yes	Exceeds background	0.014	Ohio Administrative Code[d]	No	Below ESV	0.88
Iron	7439-89-6	3/ 3	1.14	8.42	3.72	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	8.42
Lead	7439-92-1	3/ 3	0.00094	0.0107	0.00665	0	No	Yes	Exceeds background	0.12	Ohio Administrative Code[d]	No	Below ESV	0.09
Magnesium	7439-95-4	3/ 3	3.33	8.1	5.71	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**3/ 3**	**0.0287**	**2.2**	**0.932**	**0.391**	**No**	**Yes**	**Exceeds background**	**0.12**	**Tier II (Suter & Tsao 1996)**	**Yes**	**Exceeds ESV**	**18.33**
Nickel	7440-02-0	2/ 3	0.0014	0.0111	0.00448	0	No	Yes	Exceeds background	0.47	Ohio Administrative Code[d]	No	Below ESV	0.02
Potassium	7440-09-7	3/ 3	1.39	2.8	2.28	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	2/ 3	0.00036	0.00061	0.00116	0	No	Yes	Exceeds background	0.005	NAWQC 2009	No	Below ESV	0.12
Sodium	7440-23-5	3/ 3	0.53	1.43	1.06	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Vanadium	7440-62-2	2/ 3	0.002	0.0107	0.00458	0	No	Yes	Exceeds background	0.15	Ohio Administrative Code	No	Below ESV	0.07
Zinc	7440-66-6	3/ 3	0.015	0.0954	0.0629	0.042	No	Yes	Exceeds background	0.12	Ohio Administrative Code	No	Below ESV	0.80
Explosives														
HMX	2691-41-0	1/ 3	0.00008	0.00008	0.0000917	0	No	Yes	Exceeds background	1.2	Ohio Administrative Code	No	Below ESV	6.67E-05
Nitrocellulose	**9004-70-0**	**1/ 3**	**0.24**	**0.24**	**0.247**	**0**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds														
4-Methylphenol	106-44-5	1/ 1	0.00026	0.00026	0.00026	0	No	Yes	Exceeds background	0.48	Ohio Administrative Code	No	Below ESV	0.001
Volatile Organic Compounds														
Acetone	67-64-1	1/ 3	0.0022	0.0022	0.00407	0	No	Yes	Exceeds background	1.5	Tier II (Suter & Tsao 1996)	No	Below ESV	0.001

[a]Background criteria from 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 chemicals 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 (Suter, G.W. and C.L. Tsao 1996. *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota*), 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
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
NAWQC = National Ambient Water Quality Criteria
Ohio EPA = Ohio Environmental Protection Agency
PBT = Persistent, Bioaccumulative, and Toxic
RVAAP = Ravenna Army Ammunition Plant
SRC = Site-Related Contaminant
USEPA = U.S. Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-16. SRC and Integrated COPEC Screening with Maximum to OMZA Ratio for Surface Water at the Load Line 6 Former Test Pond

Analyte (mg/L)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	PBT[b] Chemical? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Metals														
Aluminum	7429-90-5	1/ 1	0.201	0.201	0.201	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	2.31
Antimony	7440-36-0	1/ 1	0.00029	0.00029	0.00029	0	No	Yes	Exceeds background	0.19	Ohio Administrative Code OMZA	No	Below ESV	0.002
Arsenic	7440-38-2	1/ 1	0.00081	0.00081	0.00081	0.0032	No	No	Below background	0.15	Ohio Administrative Code OMZA	No	Below background	0.005
Barium	7440-39-3	1/ 1	0.0099	0.0099	0.0099	0.0475	No	No	Below background	0.22	Ohio Administrative Code OMZA	No	Below background	0.05
Calcium	7440-70-2	1/ 1	20.4	20.4	20.4	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Cobalt	7440-48-4	1/ 1	0.00009	0.00009	0.00009	0	No	Yes	Exceeds background	0.024	Ohio Administrative Code OMZA	No	Below ESV	0.004
Copper	7440-50-8	1/ 1	0.0024	0.0024	0.0024	0.0079	No	No	Below background	0.0093	Ohio Administrative Code OMZA[d]	No	Below background	0.26
Iron	7439-89-6	1/ 1	1.04	1.04	1.04	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	1.04
Lead	7439-92-1	1/ 1	0.00028	0.00028	0.00028	0	No	Yes	Exceeds background	0.0064	Ohio Administrative Code OMZA[d]	No	Below ESV	0.04
Magnesium	7439-95-4	1/ 1	3.8	3.8	3.8	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	1/ 1	0.133	0.133	0.133	0.391	No	No	Below background	0.12	Tier II (Suter & Tsao 1996)	No	Below background	1.11
Potassium	7440-09-7	1/ 1	2.76	2.76	2.76	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Sodium	7440-23-5	1/ 1	0.582	0.582	0.582	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Explosives														
HMX	2691-41-0	1/ 1	0.000062	0.000062	0.000062	0	No	Yes	Exceeds background	0.22	Ohio Administrative Code OMZA	No	Below ESV	0.0003
Pesticides/PCBs														
beta-BHC	**319-85-7**	**1/ 1**	**0.000044**	**0.000044**	**0.000044**	**0**	**Yes**	**Yes**	**Exceeds background**	**0.000495**	**USEPA Reg 5**	**Yes**	**PBT chemical**	**0.09**

[a]Background criteria from 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 chemicals 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.
CAS = Chemical Abstract Service
COPEC = Chemical of Potential Ecological Concern
ESL = Ecological Screening Level
ESV = Ecological Screening Value
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
NAWQC = National Ambient Water Quality Criteria
Ohio EPA = Ohio Environmental Protection Agency
OMZA = Outside Mixing Zone Average
PBT = Persistent, Bioaccumulative, and Toxic
PCB = Polychlorinated Biphenyl
RVAAP = Ravenna Army Ammunition Plant
SRC = Site-Related Contaminant
USEPA = U.S. Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-17. SRC and Integrated COPEC Screening with Maximum to OMZA Ratio for Surface Water at the Load Line 6 Drainage Ditches

Analyte (mg/L)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	PBT[b] Chemical? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Metals														
Aluminum	**7429-90-5**	**3/ 3**	**0.71**	**6.04**	**2.64**	**3.37**	**No**	**Yes**	**Exceeds background**	**0.087**	**NAWQC 2009**	**Yes**	**Exceeds ESV**	**69.43**
Antimony	7440-36-0	1/ 3	0.00026	0.00026	0.00129	0	No	Yes	Exceeds background	0.19	Ohio Administrative Code OMZA	No	Below ESV	0.001
Arsenic	7440-38-2	3/ 3	0.00093	0.0032	0.00191	0.0032	No	No	Below background	0.15	Ohio Administrative Code OMZA	No	Below background	0.02
Barium	7440-39-3	3/ 3	0.0221	0.0667	0.0459	0.0475	No	Yes	Exceeds background	0.22	Ohio Administrative Code OMZA	No	Below ESV	0.30
Beryllium	7440-41-7	1/ 3	0.00042	0.00042	0.000335	0	No	Yes	Exceeds background	0.011	Ohio Administrative Code OMZA[d]	No	Below ESV	0.04
Cadmium	7440-43-9	2/ 3	0.00014	0.0004	0.000253	0	No	Yes	Exceeds background	0.0025	Ohio Administrative Code OMZA[d]	No	Below ESV	0.16
Calcium	7440-70-2	3/ 3	13.2	72	44.8	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	3/ 3	0.0023	0.007	0.00403	0	No	Yes	Exceeds background	0.086	Ohio Administrative Code OMZA[d]	No	Below ESV	0.08
Cobalt	7440-48-4	3/ 3	0.00026	0.0072	0.00285	0	No	Yes	Exceeds background	0.024	Ohio Administrative Code OMZA	No	Below ESV	0.30
Copper	**7440-50-8**	**3/ 3**	**0.0032**	**0.0123**	**0.00657**	**0.0079**	**No**	**Yes**	**Exceeds background**	**0.0093**	**Ohio Administrative Code OMZA[d]**	**Yes**	**Exceeds ESV**	**1.32**
Iron	7439-89-6	3/ 3	1.14	8.42	3.72	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	8.42
Lead	**7439-92-1**	**3/ 3**	**0.00094**	**0.0107**	**0.00665**	**0**	**No**	**Yes**	**Exceeds background**	**0.0064**	**Ohio Administrative Code OMZA[d]**	**Yes**	**Exceeds ESV**	**1.67**
Magnesium	7439-95-4	3/ 3	3.33	8.1	5.71	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**3/ 3**	**0.0287**	**2.2**	**0.932**	**0.391**	**No**	**Yes**	**Exceeds background**	**0.12**	**Tier II (Suter & Tsao 1996)**	**Yes**	**Exceeds ESV**	**18.33**
Nickel	7440-02-0	2/ 3	0.0014	0.0111	0.00448	0	No	Yes	Exceeds background	0.052	Ohio Administrative Code OMZA[d]	No	Below ESV	0.21
Potassium	7440-09-7	3/ 3	1.39	2.8	2.28	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	2/ 3	0.00036	0.00061	0.00116	0	No	Yes	Exceeds background	0.005	Ohio Administrative Code OMZA	No	Below ESV	0.12
Sodium	7440-23-5	3/ 3	0.53	1.43	1.06	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Vanadium	7440-62-2	2/ 3	0.002	0.0107	0.00458	0	No	Yes	Exceeds background	0.044	Ohio Administrative Code OMZA	No	Below ESV	0.24
Zinc	7440-66-6	3/ 3	0.015	0.0954	0.0629	0.042	No	Yes	Exceeds background	0.12	Ohio Administrative Code OMZA	No	Below ESV	0.80
Explosives														
HMX	2691-41-0	1/ 3	0.00008	0.00008	0.0000917	0	No	Yes	Exceeds background	0.22	Ohio Administrative Code OMZA	No	Below ESV	0.0004
Nitrocellulose	**9004-70-0**	**1/ 3**	**0.24**	**0.24**	**0.247**	**0**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds														
4-Methylphenol	106-44-5	1/ 1	0.00026	0.00026	0.00026	0	No	Yes	Exceeds background	0.053	Ohio Administrative Code OMZA	No	Below ESV	0.005
Volatile Organic Compounds														
Acetone	67-64-1	1/ 3	0.0022	0.0022	0.00407	0	No	Yes	Exceeds background	1.5	Tier II (Suter & Tsao 1996)	No	Below ESV	0.001

[a]Background criteria from 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 chemicals 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 (Suter, G.W. and C.L. Tsao 1996. *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota*), 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
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
NAWQC = National Ambient Water Quality Criteria
Ohio EPA = Ohio Environmental Protection Agency
OMZA = Outside Mixing Zone Average
PBT = Persistent, Bioaccumulative, and Toxic
RVAAP = Ravenna Army Ammunition Plant
SRC = Site-Related Contaminant
USEPA = U.S. Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-18. SRC and Integrated COPEC Screening with Average Ratio for Deep Surface Soil (0-4 ft bgs Discrete Samples) at Load Line 6 Former Production Area

Analyte (mg/kg)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]		PBT[b] Chemical? (yes/no)	SRC?[c] (yes/no)	SRC Justification	ESV	ESV Source[d]	COPEC? (yes/no)	COPEC Justification	Ratio of Avg to ESV
						Surface	Subsurface								
Metals															
Aluminum	7429-90-5	73/ 73	1990	19000	12000	17700	19500	No	No	Below background	50	PRGs	No	Below background	240
Antimony	7440-36-0	10/ 72	0.085	0.3	0.232	0.96	0.96	No	No	Below background	0.27	EcoSSL	No	Below background	0.86
Arsenic	7440-38-2	73/ 73	2.6	41	12.1	15.4	19.8	No	Yes	Exceeds background	18	EcoSSL	No	Below ESV	0.67
Barium	7440-39-3	73/ 73	30	153	75.8	88.4	124	No	Yes	Exceeds background	330	EcoSSL	No	Below ESV	0.23
Beryllium	7440-41-7	73/ 73	0.2	1.3	0.614	0.88	0.88	No	Yes	Exceeds background	21	EcoSSL	No	Below ESV	0.03
Cadmium	7440-43-9	18/ 73	0.039	6.8	0.235	0	0	No	Yes	Exceeds background	0.36	EcoSSL	No	Below ESV	0.65
Calcium	7440-70-2	73/ 73	410	184000	12800	15800	35500	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	73/ 73	5.8	29	16.6	17.4	27.2	No	Yes	Exceeds background	26	EcoSSL	No	Below ESV	0.64
Cobalt	7440-48-4	73/ 73	2.3	33	9.75	10.4	23.2	No	Yes	Exceeds background	13	EcoSSL	No	Below ESV	0.75
Copper	**7440-50-8**	**73/ 73**	**5.2**	**627**	**29.5**	**17.7**	**32.3**	**No**	**Yes**	**Exceeds background**	**28**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.05**
Iron	7439-89-6	73/ 73	9940	40200	23800	23100	35200	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	**7439-92-1**	**73/ 73**	**8.1**	**180**	**30**	**26.1**	**19.1**	**No**	**Yes**	**Exceeds background**	**11**	**EcoSSL**	**Yes**	**Exceeds ESV**	**2.73**
Magnesium	7439-95-4	73/ 73	787	8500	3470	3030	8790	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**73/ 73**	**45**	**1820**	**427**	**1450**	**3030**	**No**	**Yes**	**Exceeds background**	**220**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.94**
Mercury	**7439-97-6**	**66/ 73**	**0.011**	**0.6**	**0.0467**	**0.036**	**0.044**	**Yes**	**Yes**	**Exceeds background**	**0.00051**	**PRGs**	**Yes**	**Exceeds ESV**	**91.57**
Nickel	7440-02-0	73/ 73	8	46.6	21.3	21.1	60.7	No	Yes	Exceeds background	38	EcoSSL	No	Below ESV	0.56
Potassium	7440-09-7	73/ 73	430	2800	1300	927	3350	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	30/ 73	0.45	1.8	0.503	1.4	1.5	No	Yes	Exceeds background	0.52	EcoSSL	No	Below ESV	0.97
Silver	7440-22-4	4/ 73	0.018	0.034	0.157	0	0	No	Yes	Exceeds background	4.2	EcoSSL	No	Below ESV	0.04
Sodium	7440-23-5	33/ 73	26.6	1800	360	123	145	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	15/ 73	0.15	0.33	0.19	0	0.91	No	Yes	Exceeds background	1	PRGs	No	Below ESV	0.19
Vanadium	7440-62-2	73/ 73	5.6	32	20.6	31.1	37.6	No	No	Below background	7.8	EcoSSL	No	Below background	2.64
Zinc	**7440-66-6**	**73/ 73**	**29**	**200**	**70.4**	**61.8**	**93.3**	**No**	**Yes**	**Exceeds background**	**46**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.53**
Explosives															
HMX	**2691-41-0**	**1/ 27**	**0.19**	**0.19**	**0.0935**	**0**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Nitrocellulose	**9004-70-0**	**11/ 14**	**0.72**	**10.1**	**2.45**	**0**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds															
2-Methylnaphthalene	91-57-6	2/ 14	0.0099	0.022	0.0457	0	0	No	Yes	Detected organic	3.24	USEPA Reg 5	No	Below ESV	0.01
Acenaphthene	83-32-9	2/ 22	0.0046	0.069	0.00933	0	0	No	Yes	Detected organic	20	PRGs	No	Below ESV	4.67E-04
Anthracene	120-12-7	3/ 22	0.0092	0.13	0.0128	0	0	No	Yes	Detected organic	1480	USEPA Reg 5	No	Below ESV	8.65E-06
Benz(a)anthracene	56-55-3	11/ 22	0.0049	0.29	0.0269	0	0	No	Yes	Detected organic	5.21	USEPA Reg 5	No	Below ESV	0.01
Benzo(a)pyrene	50-32-8	10/ 22	0.0037	0.2	0.0222	0	0	No	Yes	Detected organic	1.52	USEPA Reg 5	No	Below ESV	0.01
Benzo(b)fluoranthene	205-99-2	11/ 22	0.004	0.23	0.0269	0	0	No	Yes	Detected organic	59.8	USEPA Reg 5	No	Below ESV	4.50E-04
Benzo(ghi)perylene	191-24-2	9/ 22	0.0065	0.083	0.0139	0	0	No	Yes	Detected organic	119	USEPA Reg 5	No	Below ESV	1.17E-04
Benzo(k)fluoranthene	207-08-9	7/ 22	0.0042	0.16	0.0172	0	0	No	Yes	Detected organic	148	USEPA Reg 5	No	Below ESV	1.16E-04
Bis(2-ethylhexyl)phthalate	117-81-7	7/ 14	0.016	0.16	0.0759	0	0	No	Yes	Detected organic	0.925	USEPA Reg 5	No	Below ESV	0.08
Carbazole	**86-74-8**	**1/ 14**	**0.14**	**0.14**	**0.0316**	**0**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Chrysene	218-01-9	11/ 22	0.0047	0.3	0.0283	0	0	No	Yes	Detected organic	4.73	USEPA Reg 5	No	Below ESV	0.01
Dibenz(a,h)anthracene	53-70-3	3/ 22	0.013	0.052	0.0104	0	0	No	Yes	Detected organic	18.4	USEPA Reg 5	No	Below ESV	0.001
Dibenzofuran	**132-64-9**	**1/ 14**	**0.045**	**0.045**	**0.0472**	**0**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Fluoranthene	206-44-0	12/ 22	0.0068	0.76	0.0617	0	0	No	Yes	Detected organic	122	USEPA Reg 5	No	Below ESV	0.001
Fluorene	86-73-7	1/ 22	0.057	0.057	0.00868	0	0	No	No	<5% Detected	30	PRGs	No	Below ESV	2.89E-04
Indeno(1,2,3-cd)pyrene	193-39-5	6/ 22	0.015	0.088	0.0135	0	0	No	Yes	Detected organic	109	USEPA Reg 5	No	Below ESV	1.24E-04

Table H-18. SRC and Integrated COPEC Screening with Average Ratio for Deep Surface Soil (0-4 ft bgs Discrete Samples) at Load Line 6 Former Production Area (continued)

Analyte (mg/kg)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]		PBT[b] Chemical? (yes/no)	SRC?[c] (yes/no)	SRC Justification	ESV	ESV Source[d]	COPEC? (yes/no)	COPEC Justification	Ratio of Avg to ESV
						Surface	Subsurface								
Naphthalene	91-20-3	1/ 22	0.078	0.078	0.00966	0	0	No	No	<5% Detected	0.0994	USEPA Reg 5	No	Below ESV	0.10
Phenanthrene	85-01-8	10/ 22	0.0077	0.51	0.0365	0	0	No	Yes	Detected organic	45.7	USEPA Reg 5	No	Below ESV	0.001
Pyrene	129-00-0	12/ 22	0.005	0.51	0.0441	0	0	No	Yes	Detected organic	78.5	USEPA Reg 5	No	Below ESV	0.001
Pesticides/PCBs															
4,4'-DDE	**72-55-9**	**1/ 14**	**0.0024**	**0.0024**	**0.000741**	**0**	**0**	**Yes**	**Yes**	**Detected organic**	**0.021**	**EcoSSL**	**Yes**	**PBT chemical**	**0.04**
PCB-1254	**11097-69-1**	**1/ 14**	**0.033**	**0.033**	**0.0075**	**0**	**0**	**Yes**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
PCB-1260	**11096-82-5**	**1/ 14**	**0.0096**	**0.0096**	**0.00556**	**0**	**0**	**Yes**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Volatile Organic Compounds															
Methylene chloride	75-09-2	1/ 14	0.002	0.002	0.00179	0	0	No	Yes	Detected organic	4.05	USEPA Reg 5	No	Below ESV	4.42E-04
Toluene	108-88-3	1/ 14	0.00035	0.00035	0.000964	0	0	No	Yes	Detected organic	200	PRGs	No	Below ESV	4.82E-06

[a]Background criteria for surface (0-1 ft bgs) and subsurface (>1 ft bgs) soil from 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 chemicals 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]For deep surface soil, an SRC is determined by depth. All raw data are compared to the applicable background criteria. If any sample starting at the surface (0 ft bgs) exceeds the surface background criteria, the chemical becomes an SRC. Additionally, if any subsurface (>0-4 ft bgs) sample exceeds the subsurface background criteria, it becomes an SRC.
[d]Screening Level Source: See soil ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is EcoSSLs, followed by DOE (1997a) *Preliminary Remediation Goals for Ecological Endpoints*. ES/ER/TM-162/R2, followed by Region 5 ESLs.
bgs = Below Ground Surface
CAS = Chemical Abstract Service
COPEC = Chemical of Potential Ecological Concern
DOE = U.S. Department of Energy
EcoSSL = Ecological Soil Screening Level
ESL = Ecological Screening Level
ESV = Ecological Screening Value
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
Ohio EPA = Ohio Environmental Protection Agency
PBT = Persistent, Bioaccumulative, and Toxic
PCB = Polychlorinated Biphenyl
PRG = Preliminary Remediation Goal
RVAAP = Ravenna Army Ammunition Plant
SRC = Site-Related Contaminant
USEPA = U.S. Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-19. SRC and Integrated COPEC Screening with Average Ratio for Deep Surface Soil (0-4 ft bgs Discrete Samples) at Load Line 6 Non-Production Area

Analyte (mg/kg)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]		PBT[b] Chemical? (yes/no)	SRC?[c] (yes/no)	SRC Justification	ESV	ESV Source[d]	COPEC? (yes/no)	COPEC Justification	Ratio of Avg to ESV
						Surface	Subsurface								
Metals															
Aluminum	**7429-90-5**	**23/ 23**	**3300**	**19000**	**14000**	**17700**	**19500**	**No**	**Yes**	**Exceeds background**	**50**	**PRGs**	**Yes**	**Exceeds ESV**	**280**
Antimony	7440-36-0	4/ 21	0.077	0.62	0.264	0.96	0.96	No	No	Below background	0.27	EcoSSL	No	Below background	0.98
Arsenic	7440-38-2	23/ 23	2.2	31.1	11.5	15.4	19.8	No	Yes	Exceeds background	18	EcoSSL	No	Below ESV	0.64
Barium	7440-39-3	23/ 23	42	180	79.6	88.4	124	No	Yes	Exceeds background	330	EcoSSL	No	Below ESV	0.24
Beryllium	7440-41-7	23/ 23	0.2	2.1	0.706	0.88	0.88	No	Yes	Exceeds background	21	EcoSSL	No	Below ESV	0.03
Cadmium	7440-43-9	4/ 23	0.056	2.4	0.157	0	0	No	Yes	Exceeds background	0.36	EcoSSL	No	Below ESV	0.44
Calcium	7440-70-2	23/ 23	140	57000	6360	15800	35500	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	23/ 23	5.7	26.7	17.3	17.4	27.2	No	Yes	Exceeds background	26	EcoSSL	No	Below ESV	0.67
Cobalt	7440-48-4	23/ 23	3.6	17.5	8.4	10.4	23.2	No	Yes	Exceeds background	13	EcoSSL	No	Below ESV	0.65
Copper	7440-50-8	23/ 23	5.9	85.4	17	17.7	32.3	No	Yes	Exceeds background	28	EcoSSL	No	Below ESV	0.61
Iron	7439-89-6	23/ 23	10000	45000	24800	23100	35200	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	**7439-92-1**	**23/ 23**	**9.5**	**117**	**19.9**	**26.1**	**19.1**	**No**	**Yes**	**Exceeds background**	**11**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.81**
Magnesium	7439-95-4	23/ 23	910	8800	2970	3030	8790	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**23/ 23**	**120**	**1800**	**519**	**1450**	**3030**	**No**	**Yes**	**Exceeds background**	**220**	**EcoSSL**	**Yes**	**Exceeds ESV**	**2.36**
Mercury	**7439-97-6**	**19/ 23**	**0.0081**	**0.14**	**0.0351**	**0.036**	**0.044**	**Yes**	**Yes**	**Exceeds background**	**0.00051**	**PRGs**	**Yes**	**Exceeds ESV**	**68.82**
Nickel	7440-02-0	23/ 23	8.4	36.7	17.2	21.1	60.7	No	Yes	Exceeds background	38	EcoSSL	No	Below ESV	0.45
Potassium	7440-09-7	23/ 23	475	1840	1160	927	3350	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	**7782-49-2**	**16/ 23**	**0.65**	**2.5**	**1.04**	**1.4**	**1.5**	**No**	**Yes**	**Exceeds background**	**0.52**	**EcoSSL**	**Yes**	**Exceeds ESV**	**2.00**
Silver	7440-22-4	3/ 23	0.019	0.3	0.159	0	0	No	Yes	Exceeds background	4.2	EcoSSL	No	Below ESV	0.04
Sodium	7440-23-5	8/ 23	28.4	1400	281	123	145	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	5/ 23	0.1	0.32	0.353	0	0.91	No	Yes	Exceeds background	1	PRGs	No	Below ESV	0.35
Vanadium	7440-62-2	23/ 23	6.7	31	23.7	31.1	37.6	No	No	Below background	7.8	EcoSSL	No	Below background	3.04
Zinc	**7440-66-6**	**23/ 23**	**33**	**641**	**78.8**	**61.8**	**93.3**	**No**	**Yes**	**Exceeds background**	**46**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.71**
Semi-volatile Organic Compounds															
Anthracene	120-12-7	1/ 5	0.015	0.015	0.00572	0	0	No	Yes	Detected organic	1480	USEPA Reg 5	No	Below ESV	3.86E-06
Benz(a)anthracene	56-55-3	1/ 5	0.072	0.072	0.0171	0	0	No	Yes	Detected organic	5.21	USEPA Reg 5	No	Below ESV	0.003
Benzo(a)pyrene	50-32-8	1/ 5	0.055	0.055	0.0139	0	0	No	Yes	Detected organic	1.52	USEPA Reg 5	No	Below ESV	0.01
Benzo(b)fluoranthene	205-99-2	1/ 5	0.078	0.078	0.0185	0	0	No	Yes	Detected organic	59.8	USEPA Reg 5	No	Below ESV	3.09E-04
Benzo(ghi)perylene	191-24-2	1/ 5	0.038	0.038	0.0104	0	0	No	Yes	Detected organic	119	USEPA Reg 5	No	Below ESV	8.74E-05
Benzo(k)fluoranthene	207-08-9	1/ 5	0.041	0.041	0.0111	0	0	No	Yes	Detected organic	148	USEPA Reg 5	No	Below ESV	7.50E-05
Chrysene	218-01-9	1/ 5	0.074	0.074	0.0176	0	0	No	Yes	Detected organic	4.73	USEPA Reg 5	No	Below ESV	0.004
Fluoranthene	206-44-0	1/ 5	0.14	0.14	0.0307	0	0	No	Yes	Detected organic	122	USEPA Reg 5	No	Below ESV	2.52E-04
Indeno(1,2,3-cd)pyrene	193-39-5	1/ 5	0.029	0.029	0.00866	0	0	No	Yes	Detected organic	109	USEPA Reg 5	No	Below ESV	7.94E-05
Phenanthrene	85-01-8	1/ 5	0.054	0.054	0.0135	0	0	No	Yes	Detected organic	45.7	USEPA Reg 5	No	Below ESV	2.95E-04
Pyrene	129-00-0	1/ 5	0.12	0.12	0.0269	0	0	No	Yes	Detected organic	78.5	USEPA Reg 5	No	Below ESV	3.43E-04

[a]Background criteria for surface (0-1 ft bgs) and subsurface (>1 ft bgs) soil from 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 chemicals 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]For deep surface soil, an SRC is determined by depth. All raw data are compared to the applicable background criteria. If any sample starting at the surface (0 ft bgs) exceeds the surface background criteria, the chemical becomes an SRC. Additionally, if any subsurface (>0-4 ft bgs) sample exceeds the subsurface background criteria, it becomes an SRC.

[d]Screening Level Source: See soil ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is EcoSSLs, followed by DOE (1997a) *Preliminary Remediation Goals for Ecological Endpoints*. ES/ER/TM-162/R2, followed by Region 5 ESLs.

bgs = Below Ground Surface
CAS = Chemical Abstract Service
COPEC = Chemical of Potential Ecological Concern
DOE = U.S. Department of Energy
EcoSSL = Ecological Soil Screening Level
ESL = Ecological Screening Level
ESV = Ecological Screening Value
Ohio EPA = Ohio Environmental Protection Agency
PBT = Persistent, Bioaccumulative, and Toxic
PRG = Preliminary Remediation Goal
RVAAP = Ravenna Army Ammunition Plant
SRC = Site-Related Contaminant
USEPA = U.S. Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-20. SRC and Integrated COPEC Screening with Average Ratio for Sediment at the Load Line 6 Drainage Ditches

Analyte (mg/kg)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Chemical? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Avg to ESV
Metals															
Aluminum	7429-90-5	2/ 2	7610	9600	8610	13900	29000	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Antimony	7440-36-0	1/ 2	0.091	0.091	0.203	0	1.3	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Arsenic	7440-38-2	2/ 2	8.7	9.6	9.15	19.5	25	No	No	Below background	9.79	MacDonald et al.	No	Below background	0.93
Barium	7440-39-3	2/ 2	57.4	73	65.2	123	190	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Beryllium	7440-41-7	2/ 2	0.41	0.55	0.48	0.38	0.8	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Calcium	7440-70-2	2/ 2	852	4700	2780	5510	21000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	2/ 2	12.4	14	13.2	18.1	29	No	No	Below background	43.4	MacDonald et al.	No	Below background	0.30
Cobalt	7440-48-4	2/ 2	6.3	12.8	9.55	9.1	12	No	Yes	Exceeds background	50	USEPA Reg 5	No	Below ESV	0.19
Copper	7440-50-8	2/ 2	15	21	18	27.6	32	No	No	Below background	31.6	MacDonald et al.	No	Below background	0.57
Iron	7439-89-6	2/ 2	20000	28100	24100	28200	41000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	7439-92-1	2/ 2	14.8	36	25.4	27.4	47	No	No	Below SRV	35.8	MacDonald et al.	No	Below SRV	0.71
Magnesium	7439-95-4	2/ 2	2000	2140	2070	2760	7100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	2/ 2	380	776	578	1950	1500	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Mercury	**7439-97-6**	**2/ 2**	**0.039**	**0.052**	**0.0455**	**0.059**	**0.12**	**Yes**	**Yes**	**PBT chemical**	**0.18**	**MacDonald et al.**	**Yes**	**PBT chemical**	**0.25**
Nickel	7440-02-0	2/ 2	14	19	16.5	17.7	33	No	No	Below SRV	22.7	MacDonald et al.	No	Below ESV	0.73
Potassium	7440-09-7	2/ 2	881	1000	941	1950	6800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	1/ 2	0.97	0.97	0.655	1.7	1.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Sodium	7440-23-5	1/ 2	32.1	32.1	53.6	112	--	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	1/ 2	0.095	0.095	0.115	0.89	4.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Vanadium	7440-62-2	2/ 2	13.9	17	15.5	26.1	40	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Zinc	7440-66-6	2/ 2	68	72.9	70.5	532	160	No	No	Below background	121	MacDonald et al.	No	Below background	0.58

[a]Background criteria 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 chemicals 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 sediment ESV appendix 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 Region 5 ESLs.

CAS = Chemical Abstract Service
COPEC = Chemical of Potential Ecological Concern
ESL = Ecological Screening Level
ESV = Ecological Screening Value
Ohio EPA = Ohio Environmental Protection Agency
PBT = Persistent, Bioaccumulative, and Toxic
RVAAP = Ravenna Army Ammunition Plant
SRC = Site-Related Contaminant
SRV = Sediment Reference Value
USEPA = U.S. Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-21. SRC and Integrated COPEC Screening with Average Ratio for Surface Water at the Load Line 6 Former Test Pond

Analyte (mg/L)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	PBT[b] Chemical? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Metals														
Aluminum	7429-90-5	1/ 1	0.201	0.201	0.201	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	2.31
Antimony	7440-36-0	1/ 1	0.00029	0.00029	0.00029	0	No	Yes	Exceeds background	0.19	Ohio Administrative Code OMZA	No	Below ESV	0.002
Arsenic	7440-38-2	1/ 1	0.00081	0.00081	0.00081	0.0032	No	No	Below background	0.15	Ohio Administrative Code OMZA	No	Below background	0.005
Barium	7440-39-3	1/ 1	0.0099	0.0099	0.0099	0.0475	No	No	Below background	0.22	Ohio Administrative Code OMZA	No	Below background	0.05
Calcium	7440-70-2	1/ 1	20.4	20.4	20.4	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Cobalt	7440-48-4	1/ 1	0.00009	0.00009	0.00009	0	No	Yes	Exceeds background	0.024	Ohio Administrative Code OMZA	No	Below ESV	0.004
Copper	7440-50-8	1/ 1	0.0024	0.0024	0.0024	0.0079	No	No	Below background	0.0093	Ohio Administrative Code OMZA[d]	No	Below background	0.26
Iron	7439-89-6	1/ 1	1.04	1.04	1.04	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	1.04
Lead	7439-92-1	1/ 1	0.00028	0.00028	0.00028	0	No	Yes	Exceeds background	0.0064	Ohio Administrative Code OMZA[d]	No	Below ESV	0.04
Magnesium	7439-95-4	1/ 1	3.8	3.8	3.8	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	1/ 1	0.133	0.133	0.133	0.391	No	No	Below background	0.12	Tier II (Suter & Tsao 1996)	No	Below background	1.11
Potassium	9/7/7440	1/ 1	2.76	2.76	2.76	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Sodium	7440-23-5	1/ 1	0.582	0.582	0.582	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Explosives														
HMX	2691-41-0	1/ 1	0.000062	0.000062	0.000062	0	No	Yes	Exceeds background	0.22	Ohio Administrative Code OMZA	No	Below ESV	0.0003
Pesticides/PCBs														
beta-BHC	**319-85-7**	**1/ 1**	**0.000044**	**0.000044**	**0.000044**	**0**	**Yes**	**Yes**	**Exceeds background**	**0.000495**	**USEPA Reg 5**	**Yes**	**PBT chemical**	**0.09**

[a]Background criteria from 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 chemicals 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 OMZA, 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
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
NAWQC = National Ambient Water Quality Criteria
Ohio EPA = Ohio Environmental Protection Agency
OMZA = Outside Mixing Zone Average
PBT = Persistent, Bioaccumulative, and Toxic
PCB = Polychlorinated Biphenyl
RVAAP = Ravenna Army Ammunition Plant
SRC = Site-Related Contaminant
USEPA = U.S. Environmental Protection Agency
Bold = Chemical is a COPEC

Table H-22. SRC and Integrated COPEC Screening with Average Ratio for Surface Water at the Load Line 6 Drainage Ditches

Analyte (mg/L)	CAS Number	Freq of Detect	Minimum Detect	Maximum Detect	Average Result	Background Criteria[a]	PBT[b] Chemical? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Avg to ESV
Metals														
Aluminum	**7429-90-5**	**3/ 3**	**0.71**	**6.04**	**2.64**	**3.37**	**No**	**Yes**	**Exceeds background**	**0.087**	**NAWQC 2009**	**Yes**	**Exceeds ESV**	**30.34**
Antimony	7440-36-0	1/ 3	0.00026	0.00026	0.00129	0	No	Yes	Exceeds background	0.19	Ohio Administrative Code OMZA	No	Below ESV	0.007
Arsenic	7440-38-2	3/ 3	0.00093	0.0032	0.00191	0.0032	No	No	Below background	0.15	Ohio Administrative Code OMZA	No	Below background	0.01
Barium	7440-39-3	3/ 3	0.0221	0.0667	0.0459	0.0475	No	Yes	Exceeds background	0.22	Ohio Administrative Code OMZA	No	Below ESV	0.21
Beryllium	7440-41-7	1/ 3	0.00042	0.00042	0.000335	0	No	Yes	Exceeds background	0.011	Ohio Administrative Code OMZA[d]	No	Below ESV	0.03
Cadmium	7440-43-9	2/ 3	0.00014	0.0004	0.000253	0	No	Yes	Exceeds background	0.0025	Ohio Administrative Code OMZA[d]	No	Below ESV	0.10
Calcium	7440-70-2	3/ 3	13.2	72	44.8	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	3/ 3	0.0023	0.007	0.00403	0	No	Yes	Exceeds background	0.086	Ohio Administrative Code OMZA[d]	No	Below ESV	0.05
Cobalt	7440-48-4	3/ 3	0.00026	0.0072	0.00285	0	No	Yes	Exceeds background	0.024	Ohio Administrative Code OMZA	No	Below ESV	0.12
Copper	7440-50-8	3/ 3	0.0032	0.0123	0.00657	0.0079	No	Yes	Exceeds background	0.0093	Ohio Administrative Code OMZA[d]	No	Below ESV	0.71
Iron	7439-89-6	3/ 3	1.14	8.42	3.72	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	3.72
Lead	**7439-92-1**	**3/ 3**	**0.00094**	**0.0107**	**0.00665**	**0**	**No**	**Yes**	**Exceeds background**	**0.0064**	**Ohio Administrative Code OMZA[d]**	**Yes**	**Exceeds ESV**	**1.04**
Magnesium	7439-95-4	3/ 3	3.33	8.1	5.71	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**3/ 3**	**0.0287**	**2.2**	**0.932**	**0.391**	**No**	**Yes**	**Exceeds background**	**0.12**	**Tier II (Suter & Tsao 1996)**	**Yes**	**Exceeds ESV**	**7.77**
Nickel	7440-02-0	2/ 3	0.0014	0.0111	0.00448	0	No	Yes	Exceeds background	0.052	Ohio Administrative Code OMZA[d]	No	Below ESV	0.09
Potassium	7440-09-7	3/ 3	1.39	2.8	2.28	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	2/ 3	0.00036	0.00061	0.00116	0	No	Yes	Exceeds background	0.005	Ohio Administrative Code OMZA	No	Below ESV	0.23
Sodium	7440-23-5	3/ 3	0.53	1.43	1.06	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Vanadium	7440-62-2	2/ 3	0.002	0.0107	0.00458	0	No	Yes	Exceeds background	0.044	Ohio Administrative Code OMZA	No	Below ESV	0.10
Zinc	7440-66-6	3/ 3	0.015	0.0954	0.0629	0.042	No	Yes	Exceeds background	0.12	Ohio Administrative Code OMZA	No	Below ESV	0.52
Explosives														
HMX	2691-41-0	1/ 3	0.00008	0.00008	0.0000917	0	No	Yes	Exceeds background	0.22	Ohio Administrative Code OMZA	No	Below ESV	0.0004
Nitrocellulose	**9004-70-0**	**1/ 3**	**0.24**	**0.24**	**0.247**	**0**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds														
4-Methylphenol	106-44-5	1/ 1	0.00026	0.00026	0.00026	0	No	Yes	Exceeds background	0.053	Ohio Administrative Code OMZA	No	Below ESV	0.005
Volatile Organic Compounds														
Acetone	67-64-1	1/ 3	0.0022	0.0022	0.00407	0	No	Yes	Exceeds background	1.5	Tier II (Suter & Tsao 1996)	No	Below ESV	0.003

[a]Background criteria from 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 chemicals 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.
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