APPENDIX H

Ecological Risk Assessment Information and Data

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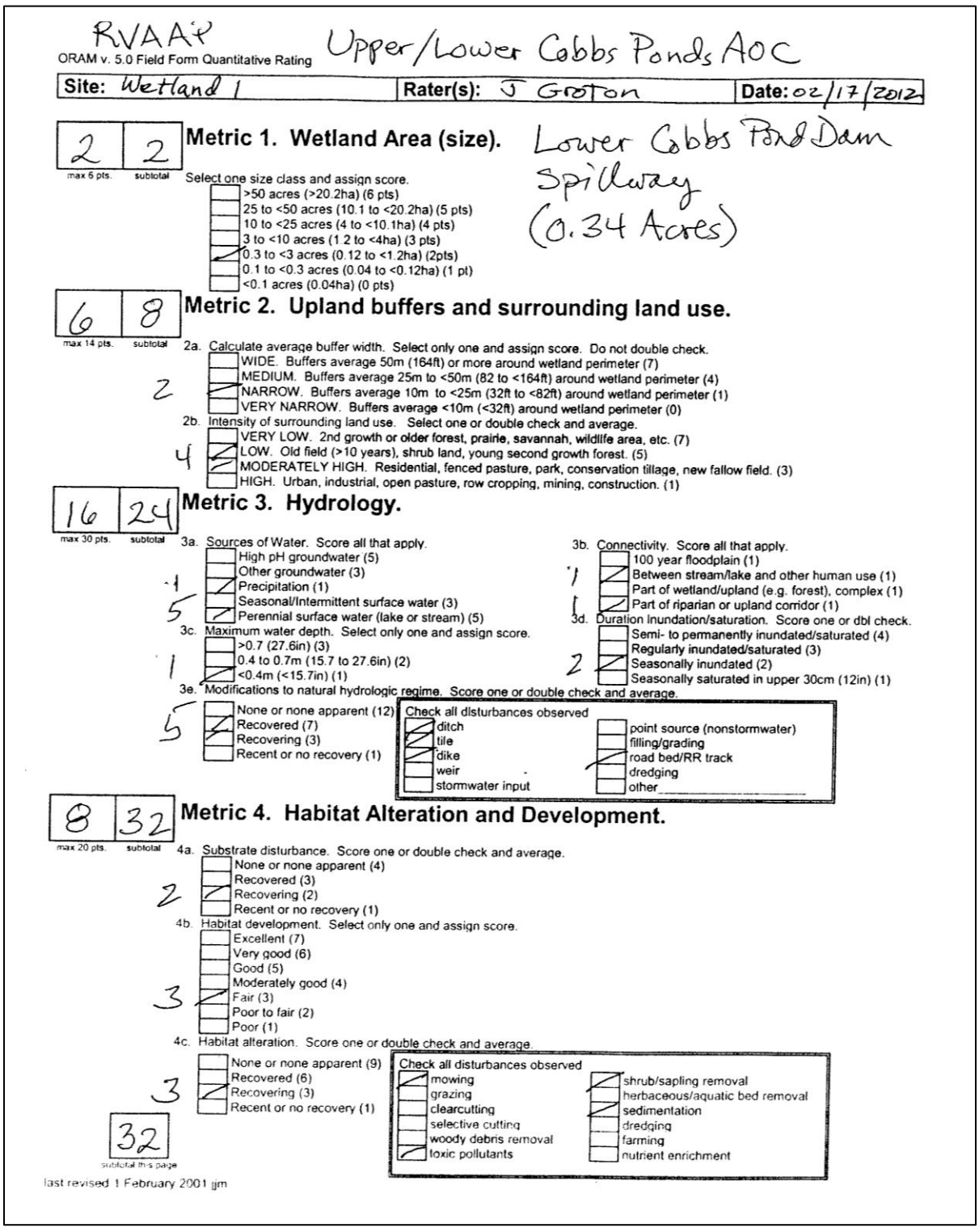

RVAAP Upper/Lower Cobbs Ponds AOC

ORAM v. 5.0 Field Form Quantitative Rating

Site: Wetland 1 | Rater(s): J Groton | Date: 02/17/2012

Metric 1. Wetland Area (size). (2 / 2; max 6 pts.; subtotal)

Lower Cobbs Pond Dam Spillway (0.34 Acres)

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)
- [x] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 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. (6 / 8; max 14 pts.; subtotal)

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

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

- [ ] 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)
- [x] 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. (16 / 24; max 30 pts.; subtotal)

3a. Sources of Water. Score all that apply. (-1, 5)

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

3b. Connectivity. Score all that apply. (1, 1)

- [ ] 100 year floodplain (1)
- [x] Between stream/lake and other human use (1)
- [ ] 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. (2)

- [ ] 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. (5)

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

Check all disturbances observed

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

Metric 4. Habitat Alteration and Development. (8 / 32; max 20 pts.; subtotal)

4a. Substrate disturbance. Score one or double check and average. (2)

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

4b. Habitat development. Select only one and assign score. (3)

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

4c. Habitat alteration. Score one or double check and average. (3)

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

Check all disturbances observed

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

32 subtotal this page

last revised 1 February 2001 jjm

Figure H-1. Ohio Rapid Assessment Method Worksheet for Wetland 1 at Upper and Lower Cobbs Ponds AOC

RVAA P Upper/Lower Cobbs Ponds AOC

ORAM v. 5.0 Field Form Quantitative Rating

Site: Wetland 1 | Rater(s): J Groton | Date: 02/17/2012

32 (subtotal first page)

Metric 5. Special Wetlands. Lower Cobbs Pond Dam Spillway

0 (max 10 pts.) | 32 (subtotal)

Check all that apply and score as indicated.

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

Metric 6. Plant communities, interspersion, microtopography.

2 (max 20 pts.) | 34 (subtotal)

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

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

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

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

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

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

Vegetation Community Cover Scale

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

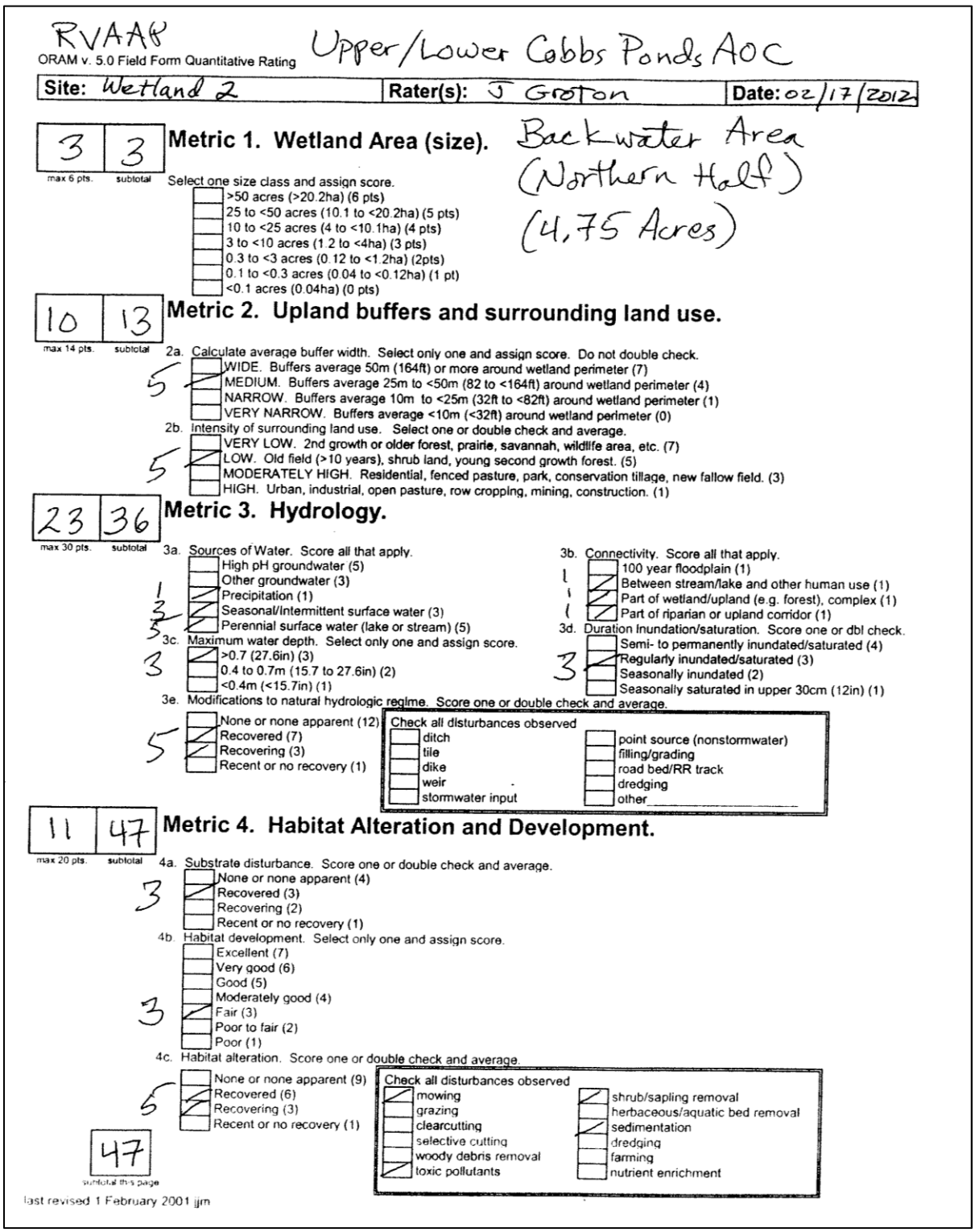
Microtopography Cover Scale

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

34 Category 2

End of Quantitative Rating. Complete Categorization Worksheets.

Figure H-1. Ohio Rapid Assessment Method Worksheet for Wetland 1 at Upper and Lower Cobbs Ponds AOC (continued)


RVAAP
ORAM v. 5.0 Field Form Quantitative Rating
Upper/Lower Cobbs Ponds AOC

Site: Wetland 2 | Rater(s): J Groton | Date: 02/17/2012

Metric 1. Wetland Area (size). (3 / 3; max 6 pts. / subtotal)

Backwater Area (Northern Half) (4.75 Acres)

Select one size class and assign score.
- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

Metric 2. Upland buffers and surrounding land use. (10 / 13; max 14 pts. / subtotal)

2a. Calculate average buffer width. Select only one and assign score. Do not double check. (5)
- [ ] 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)

2b. Intensity of surrounding land use. Select one or double check and average. (5)
- [ ] 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. (23 / 36; max 30 pts. / subtotal)

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

3b. Connectivity. Score all that apply. (1, 1, 1)
- [ ] 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. (3)
- [x] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <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. (5)
- [ ] None or none apparent (12)
- [x] Recovered (7)
- [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. (11 / 47; 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. (3)
- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [x] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

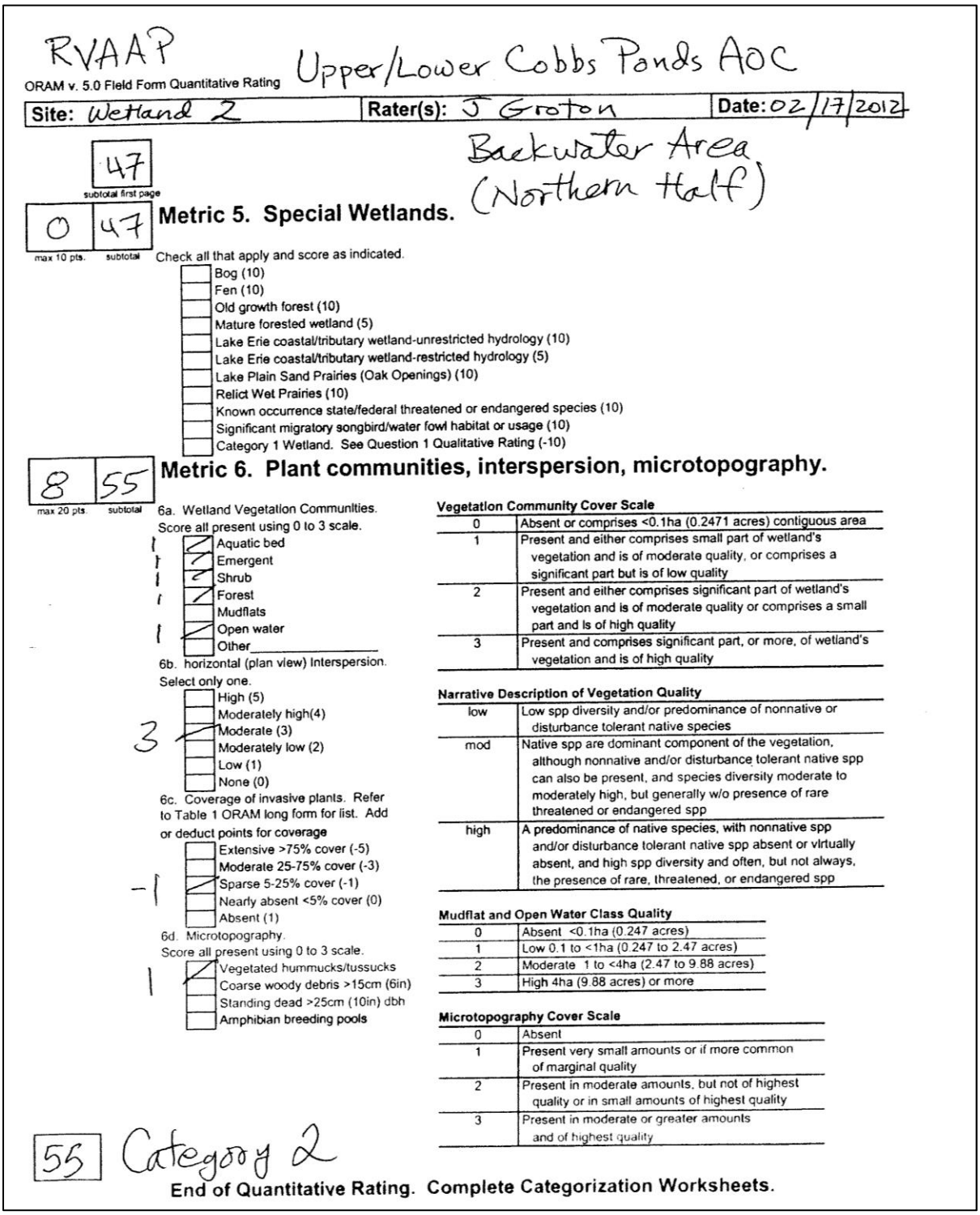
4c. Habitat alteration. Score one or double check and average. (5)
- [ ] None or none apparent (9)
- [x] Recovered (6)
- [x] Recovering (3)
- [ ] Recent or no recovery (1)

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

47
subtotal this page

last revised 1 February 2001 jjm

Figure H-2. Ohio Rapid Assessment Method Worksheet for Wetland 2 at Upper and Lower Cobbs Ponds AOC


RVAAP Upper/Lower Cobbs Ponds AOC

ORAM v. 5.0 Field Form Quantitative Rating

Site: Wetland 2 | Rater(s): J Groton | Date: 02/17/2012

Backwater Area (Northern Half)

47 subtotal first page

Metric 5. Special Wetlands. 0 max 10 pts. | 47 subtotal

Check all that apply and score as indicated.

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

Metric 6. Plant communities, interspersion, microtopography. 8 max 20 pts. | 55 subtotal

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

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

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

- [ ] High (5)
- [ ] Moderately high(4)
- [x] Moderate (3) (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

- [ ] 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.

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

Vegetation Community Cover Scale

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

55 Category 2

End of Quantitative Rating. Complete Categorization Worksheets.

Figure H-2. Ohio Rapid Assessment Method Worksheet for Wetland 2 at Upper and Lower Cobbs Ponds AOC (continued)

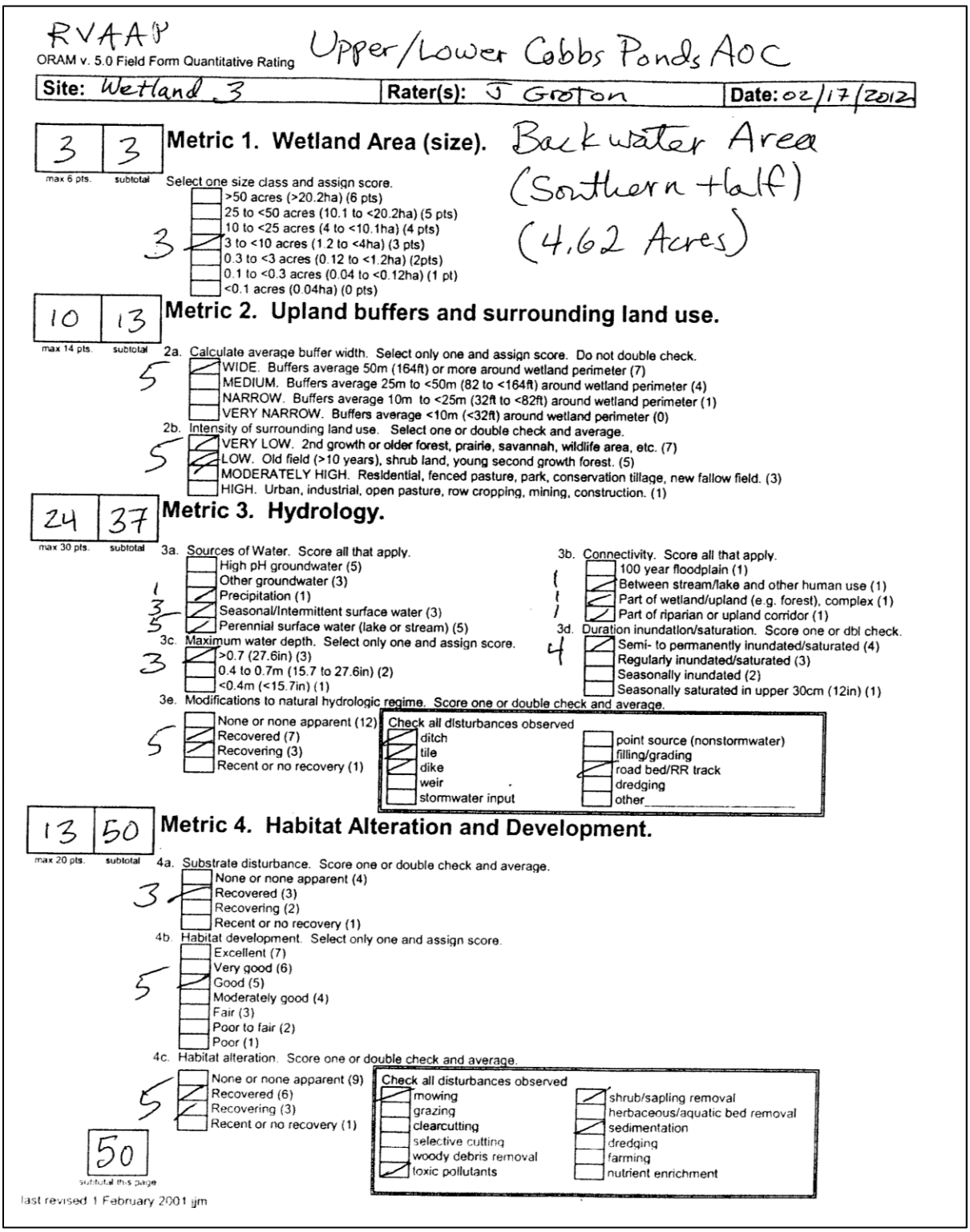

RVAAP
ORAM v. 5.0 Field Form Quantitative Rating
Upper/Lower Cobbs Ponds AOC
Site: Wetland 3 | Rater(s): J Groton | Date: 02/17/2012
3 | 3 max 6 pts. subtotal
Metric 1. Wetland Area (size).
Backwater Area (Southern Half) (4.62 Acres)
Select one size class and assign score.
>50 acres (>20.2ha) (6 pts)
25 to <50 acres (10.1 to <20.2ha) (5 pts)
10 to <25 acres (4 to <10.1ha) (4 pts)
3 to <10 acres (1.2 to <4ha) (3 pts)
0.3 to <3 acres (0.12 to <1.2ha) (2pts)
0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
<0.1 acres (0.04ha) (0 pts)
10 | 13 max 14 pts. subtotal
Metric 2. Upland buffers and surrounding land use.
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)
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)
MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)
24 | 37 max 30 pts. subtotal
Metric 3. Hydrology.
3a. Sources of Water. Score all that apply.
High pH groundwater (5)
Other groundwater (3)
Precipitation (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)
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)
3d. Duration inundation/saturation. Score one or dbl check.
Semi- to permanently inundated/saturated (4)
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.
None or none apparent (12)
Recovered (7)
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
13 | 50 max 20 pts. subtotal
Metric 4. Habitat Alteration and Development.
4a. Substrate disturbance. Score one or double check and average.
None or none apparent (4)
Recovered (3)
Recovering (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)
Poor (1)
4c. Habitat alteration. Score one or double check and average.
None or none apparent (9)
Recovered (6)
Recovering (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
50 subtotal this page
last revised 1 February 2001 jjm

Figure H-3. Ohio Rapid Assesment Method Worksheet for Wetland 3 at Upper and Lower Cobbs Ponds AOC

RVAAP Upper/Lower Cobbs Ponds AOC

ORAM v. 5.0 Field Form Quantitative Rating

Site: Wetland 3 | Rater(s): J Groton | Date: 02/17/2012

Backwater Area (Southern Half)

50 subtotal first page

Metric 5. Special Wetlands. 0 max 10 pts. | 50 subtotal

Check all that apply and score as indicated.

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

Metric 6. Plant communities, interspersion, microtopography. 11 max 20 pts. | 61 subtotal

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

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

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

- [ ] High (5)
- [x] 4 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

- [ ] Extensive >75% cover (-5)
- [x] -2 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.

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

Vegetation Community Cover Scale

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

61 Category 3

End of Quantitative Rating. Complete Categorization Worksheets.

Figure H-3. Ohio Rapid Assesment Method Worksheet for Wetland 3 at Upper and Lower Cobbs Ponds AOC (continued)

Table H-1. Historical SERA COPEC Screen for Surface Soil

COPC SELECTION TABLE FOR POND BANK SOIL
Upper and Lower Cobbs Ponds Phase II Remedial Investigation
Ravenna Army Ammunition Plant, Ravenna, Ohio

Parameter	FOD	Max Conc.	Avg. Conc	Selected Upper Confidence Level	Bkg. Conc.	Max Conc. > Bkg. Conc.	Soil Screening Level		HQ	Bio. Chemical	PBT Chemical	Selected as a COPC?	Rationale
							Value	Source					
Energetics (mg/kg)													
Nitrocellulose	1/1	1.5	1.08	1.08	NA	Yes	NA	NA	NA	NO	NO	YES	NTX
Inorganics (mg/kg)													
Aluminum	10/10	19200	13350	15488	17700	Yes	50	c	384	NO	NO	YES	ASL
Antimony	5/10	0.46	0.23	0.31	0.96	No	5	a	0.092	NO	NO	NO	BSL,BKG
Arsenic	10/10	16.9	10.6	13.3	15.4	Yes	9.9	a	1.71	YES	NO	YES	ASL,BIO
Barium	10/10	90.4	63.4	72.0	88.4	Yes	283	a	0.32	NO	NO	NO	BSL,BKG
Beryllium	10/10	0.86	0.54	0.65	0.88	No	10	a	0.086	NO	NO	NO	BSL,BKG
Cadmium	5/10	0.16	0.092	0.12	NA	Yes	4	a	0.040	YES	NO	YES	BIO
Calcium	10/10	4040	1215	2699	15800	No	NA	NA	NA	NO	NO	NO	NUT
Chromium	10/10	24.8	16.7	20.4	17.4	Yes	0.4	a	62.0	YES	NO	YES	ASL,BIO
Cobalt	10/10	12	8.41	10.3	10.4	Yes	20	a	0.60	NO	NO	NO	BSL
Copper	10/10	23.9	14.0	22.9	17.7	Yes	60	a	0.40	YES	NO	YES	BIO
Cyanide, Total	3/10	0.45	0.20	0.45	NA	Yes	1.33	d	0.34	NO	NO	NO	BSL
Iron	10/10	44000	23400	31277	23100	Yes	200 (1)	b	220	NO	NO	YES	ASL
Lead	10/10	25	19.6	21.4	26.1	No	40.5	a	0.62	YES	NO	NO	BSL, BKG
Magnesium	10/10	4310	2778	3749	3030	Yes	NA	NA	NA	NO	NO	NO	NUT
Manganese	10/10	397	201	273	1450	No	100 (1)	b	3.97	NO	NO	NO	BKG
Mercury	10/10	0.066	0.037	0.044	0.04	Yes	0.00051	a	129	YES	YES	YES	ASL,BIO
Nickel	10/10	27.2	17.2	23.9	21.1	Yes	30	a	0.91	YES	NO	YES	BIO
Potassium	10/10	2220	1284	1594	927	Yes	NA	NA	NA	NO	NO	NO	NUT
Selenium	8/10	1.4	0.70	0.87	1.4	No	0.21	a	6.67	YES	NO	NO	BKG
Silver	3/10	0.45	0.19	0.45	NA	Yes	2	a	0.23	YES	NO	YES	BIO
Sodium	10/10	159	104	124	123	Yes	NA	NA	NA	NO	NO	NO	NUT
Thallium	1/10	0.25	0.22	0.25	NA	Yes	1	a	0.25	NO	NO	NO	BSL
Vanadium	10/10	35.3	23.2	26.7	31.1	Yes	2	a	17.7	NO	NO	YES	ASL
Zinc	10/10	81.1	64.0	70.9	61.8	Yes	8.5	a	9.54	YES	NO	YES	ASL,BIO
Miscellaneous Parameters (mg/kg)													
Nitrate, as N	1/10	1.4	0.55	1.4	NA	Yes	NA	NA	NA	NO	NO	YES	NTX

Notes:
- Average concentration includes positive detections and non-detected results. Detection limits are divided by two.
- Frequency of detection refers to number of times compound was detected among all samples versus total number of samples analyzed for that parameter.
- Number of samples may vary based on the number of usable results.
- Shaded cells are chemicls that are retained as COPCs

Footnotes:
1 - Based on toxicity to microorganisms because a plant value (source c) for this chemical is not available.

Abbreviations:
Avg. Conc.: Average Concentration
Bio.: Bioaccumulative
Bkg. Conc.: Background Concentration
COPC: Chemical of Potential Concern
FOD: Frequency of Detection
HQ: Hazard Quotient = (Maximum Concentration)/(Soil Screening Level)
Max. Conc.: Maximum Concentration
NA: Not available/Not applicable
PBT: Persistent, Bioaccumulative, and Toxic
PCB: Polychlorinated Biphenyl

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

Rationale Codes:
For Selection as a COPC:
ASL = Above Screening Level
BIO = Bioaccumulative
NTX = No Toxicity Data Available/Screening Level not Available

For Elimination as a COPC:
BKG = Below Background
BSL = At or Below COPC Screening Level
NUT = Essential Nutrient

COPEC = Chemical of potential ecological concern.
SERA = Screening ecological risk assessment.

Table H-2. Historical SERA COPEC Screen for Sediment

COPC SELECTION TABLE FOR SEDIMENT
Upper and Lower Cobbs Ponds Phase II Remedial Investigation
Ravenna Army Ammunition Plant, Ravenna, Ohio

Parameter	FOD	Max Conc.	Avg. Conc	Selected Upper Confidence Level	Bkg. Conc.	Ohio Sediment Reference Value (SRV)[1]	Max Conc. > Bkg. Conc. and Ohio SRV	Sediment Screening Level		HQ	PBT Chemical	Selected as a COPC?	Rationale
								Value	Source				
Volatile Organic Compounds (mg/kg)													
2-Butanone	3/5	0.035	0.016	NA[2]	NA	NA	NA	0.137	b	0.26	NO	NO	BSL
Acetone	5/5	0.14	0.083	NA[2]	NA	NA	NA	0.709	b	0.20	NO	NO	BSL
Methylene Chloride	1/5	0.048	0.011	NA[2]	NA	NA	NA	1.26	b	0.038	NO	NO	BSL
Semivolatile Organic Compounds (mg/kg)													
2,6-Dinitrotoluene	1/27	0.16	0.029	0.16	NA	NA	NA	0.0206	b	7.77	NO	YES	ASL
Anthracene	1/5	0.22	0.10	NA[2]	NA	NA	NA	0.0572	a	3.85	NO	YES	ASL
Benzo(a)anthracene	1/5	0.83	0.21	NA[2]	NA	NA	NA	0.108	a	7.69	NO	YES	ASL
Benzo(a)pyrene	2/5	0.89	0.26	NA[2]	NA	NA	NA	0.15	a	5.93	NO	YES	ASL
Benzo(b)fluoranthene	1/5	0.86	0.26	NA[2]	NA	NA	NA	10.4	b	0.083	NO	NO	BSL
Benzo(g,h,i)perylene	1/5	0.49	0.22	NA[2]	NA	NA	NA	0.17	b	2.88	NO	YES	ASL
Benzo(k)fluoranthene	1/5	0.8	0.25	NA[2]	NA	NA	NA	0.24	b	3.33	NO	YES	ASL
Chrysene	2/5	0.93	0.26	NA[2]	NA	NA	NA	0.166	a	5.60	NO	YES	ASL
Fluoranthene	1/5	1.8	0.44	NA[2]	NA	NA	NA	0.423	a	4.26	NO	YES	ASL
Indeno(1,2,3-cd)pyrene	1/5	0.48	0.18	NA[2]	NA	NA	NA	0.2	b	2.4	NO	YES	ASL
Phenanthrene	1/5	0.91	0.24	NA[2]	NA	NA	NA	0.0419	b	21.72	NO	YES	ASL
Pyrene	1/5	1.9	0.49	NA[2]	NA	NA	NA	0.195	a	9.74	NO	YES	ASL
Total PAHs	1/5	10.1	2.90	NA[2]	NA	NA	NA	1.61	a	6.27	NO	YES	ASL
Pesticides PCBs (mg/kg)													
Aroclor-1254	3/3	0.047	0.042	NA[2]	NA	NA	NA	0.0598 [3]	a	0.79	YES	YES	BIO
Energetics (mg/kg)													
2,4,6-TNT	6/27	0.32	0.045	0.32	NA	NA	NA	NA	NA	NA	NO	YES	NTX
Nitrocellulose	3/3	3	2.52	NA[2]	NA	NA	NA	NA	NA	NA	NO	YES	NTX
Inorganics (mg/kg)													
Aluminum	27/27	21400	13156	14213	13900	29000	NO	NA	NA	NA	NO	NO	BKG
Antimony	15/27	1.4	0.40	0.54	NA	1.3	YES	NA	NA	NA	NO	YES	NTX
Arsenic	27/27	34.3	12.5	15.5	19.5	25	YES	9.79	a	3.50	NO	YES	ASL
Barium	27/27	147	91.3	102	123	190	NO	NA	NA	NA	NO	NO	BKG
Beryllium	27/27	1.4	0.80	0.91	0.38	0.8	YES	NA	NA	NA	NO	YES	NTX
Cadmium	23/27	7.3	1.04	2.70	NA	0.79	YES	0.99	a	7.37	NO	YES	ASL
Calcium	27/27	15400	3012	3843	5510	21000	NO	NA	NA	NA	NO	NO	BKG,NUT
Chromium	27/27	150	34.2	44.0	18.1	29	YES	43.4	a	3.46	NO	YES	ASL
Cobalt	27/27	23.3	12.7	14.8	9.1	12	YES	50	b	0.47	NO	NO	BSL
Copper	27/27	149	37.2	50.0	27.6	32	YES	31.6	a	4.72	NO	YES	ASL
Cyanide, Total	6/27	1.2	0.27	1.20	NA	NA	NA	0.0001	b	12000	NO	YES	ASL
Hexavalent Chromium	4/27	10.6	1.25	10.6	NA	29	NO	43.4	a	0.24	NO	NO	BSL,BKG
Iron	27/27	36400	22909	24821	28200	41000	NO	NA	NA	NA	NO	NO	BKG
Lead	27/27	60.4	29.8	35.7	27.4	47	YES	35.8	a	1.69	NO	YES	ASL
Magnesium	27/27	3830	2379	2642	2760	7100	NO	NA	NA	NA	NO	NO	BKG,NUT
Manganese	27/27	966	468	574	1950	1500	NO	NA	NA	NA	NO	NO	BKG
Mercury	27/27	0.18	0.064	0.09	0.06	0.12	YES	0.18	a	1	YES	YES	BIO
Nickel	27/27	35.4	20.8	22.9	17.7	33	YES	22.7	a	1.56	NO	YES	ASL
Potassium	27/27	2100	1317	1444	1950	6800	NO	NA	NA	NA	NO	NO	BKG,NUT
Selenium	12/27	1.5	0.35	1.50	1.7	1.7	NO	NA	NA	NA	NO	NO	BKG
Silver	20/27	130	8.81	47.4	NA	0.43	YES	0.5	b	260	NO	YES	ASL
Sodium	27/27	340	133	165	112	NA	YES	NA	NA	NA	NO	NO	NUT
Thallium	1/27	0.24	0.16	0.24	0.89	4.7	NO	NA	NA	NA	NO	NO	BKG

Table H-2. Historical SERA COPEC Screen for Sediment (continued)

Parameter	FOD	Max Conc.	Avg. Conc	Selected Upper Confidence Level	Bkg. Conc.	Ohio Sediment Reference Value (SRV)[1]	Max Conc. > Bkg. Conc. and Ohio SRV	Sediment Screening Level		HQ	PBT Chemical	Selected as a COPC?	Rationale
								Value	Source				
Vanadium	27/27	33.4	22.0	24.1	26.1	40	NO	NA	NA	NA	NO	NO	BKG
Zinc	27/27	479	188	252	532	160	NO	121	a	3.96	NO	NO	BKG
Miscellaneous Parameters (mg/kg)													
Nitrate, as N	2/27	13	1.18	13.0	NA	NA	NA	NA	NA	NA	NO	YES	NTX

Notes:
- Average concentration includes positive detections and non-detected results. Detection limits are divided by two.
- Frequency of detection refers to number of times compound was detected among all samples versus total number of samples analyzed for that parameter.
- Number of samples may vary based on the number of usable results.

Footnotes:
1 - Erie/Ontario Lake Plain value is used.
2 - An Upper Confidence Level was not calculated because the pararameter was analyzed for in less than 10 samples.
3 - Value is based on Total PCB value

Abbreviations:
Max. Conc.: Maximum Concentration
Avg. Conc.: Average Concentration
Bkg. Conc.: Background Concentration
COPC: Chemical of Potential Concern
FOD: Frequency of Detection
HQ: Hazard Quotient = (Maximum Concentration)/(Screening Level)
NA: Not available/Not applicable
PBT: Persistent, Bioaccumulative, and Toxic
PCB: Polychlorinated Biphenyl

Sources of Screening Levels and Heirarchy for Selection:
a - Threshold Effects Concentration from McDonald et al., (2000)
b - Ecological Data Quality Level (USEPA Region 5, 1999)

Rationale Codes:
For Selection as a COPC:
ASL = Above Screening Level
BIO = Bioaccumulative
NTX = No Toxicity Data Available/Screening Level not Available

For Elimination as a COPC:
BSL = At or Below COPC Screening Level
BKG = At or less than the Background Concentration or Ohio Sediment Reference Value
NUT = Essential Nutrient

COPEC = Chemical of potential ecological concern.
SERA = Screening ecological risk assessment.
SRV = Sediment reference value.

Table H-3. Historical SERA COPEC Screen for Surface Water

COPC SELECTION TABLE FOR SURFACE WATER
Upper and Lower Cobbs Ponds Phase II Remedial Investigation
Ravenna Army Ammunition Plant, Ravenna, Ohio

Parameter	FOD	Max Conc.	Avg. Conc	Bkg. Conc.	Max Conc. > Bkg. Conc.	Surface Water Screening Level		HQ	PBT Chemical	Selected as a COPC?	Rationale
						Value	Source				
Volatile Organic Compounds (ug/L)											
Acetone	1/1	5	4	NA	Yes	NA	NA	NA	NO	YES	NTX
Chloromethane	1/1	1	0.85	NA	Yes	NA	NA	NA	NO	YES	NTX
Toluene	1/1	1	1	NA	Yes	560 (1)	a	0.0018	NO	NO	BSL
Inorganics (ug/L)											
Aluminum	7/7	2520	568	3370	No	87	b	29.0	NO	NO	BKG
Arsenic	5/7	10.4	3.31	3.2	Yes	340 (1)	a	0.031	NO	NO	BSL
Barium	7/7	382	71.0	47.5	Yes	2000 (1)	a	0.19	NO	NO	BSL
Calcium	7/7	67700	31064	41400	Yes	NA	NA	NA	NO	NO	NUT
Chromium	2/7	6.7	2.34	NA	Yes	16 (1,3)	a	0.42	NO	NO	BSL
Cobalt	2/7	10.7	2.7	NA	Yes	220 (1)	a	0.049	NO	NO	BSL
Copper	1/7	8.8	1.93	7.9	Yes	13 (1,2)	a	0.68	NO	NO	BSL
Iron	7/7	16300	3643	2560	Yes	1000	b	16.3	NO	YES	ASL
Magnesium	7/7	11200	5731	10800	Yes	NA	NA	NA	NO	NO	NUT
Manganese	7/7	15800	3115	391	Yes	NA	NA	NA	NO	YES	NTX
Nickel	2/7	6.7	2.1	NA	Yes	470 (1,2)	a	0.014	NO	NO	BSL
Potassium	7/7	15700	3328	3170	Yes	NA	NA	NA	NO	NO	NUT
Selenium	1/7	10.4	3.38	NA	Yes	4.6 (4)	a	2.26	NO	YES	ASL
Silver	1/7	1.7	0.73	NA	Yes	1.4 (1,2)	a	1.21	NO	YES	ASL
Sodium	7/7	12900	5346	21300	No	NA	NA	NA	NO	NO	NUT
Vanadium	4/7	5	2.41	NA	Yes	150 (1)	a	0.033	NO	NO	BSL
Zinc	7/7	109	21.2	42	Yes	120 (1,2)	a	0.91	NO	NO	BSL
Miscellaneous Parameters (mg/L)											
Sulfate	6/7	29	15.0	NA	Yes	NA	NA	NA	NO	YES	NTX
Sulfide	4/7	2.3	0.66	NA	Yes	2	b	1.15	NO	YES	ASL

Notes:
- Average concentration includes positive detections and non-detected results. Detection limits are divided by two.
- Frequency of detection refers to number of times compound was detected among all samples versus total number of samples analyzed for that parameter.
- Number of samples may vary based on the number of usable results.

Footnotes:
1 - Outside Mixing Zone Maximum value, unless otherwise noted.
2 - Based on water hardness of 100 mg/L and using dissolved criteria.
3 - Value is for hexavalent chromium
4 - Outside Mixing Zone Average value

Abbreviations:
Max. Conc.: Maximum Concentration
Avg. Conc.: Average Concentration
Bkg. Conc.: Background Concentration
COPC: Chemical of Potential Concern
FOD: Frequency of Detection
HQ: Hazard Quotient = (Maximum Concentration)/(Screening Level)
NA: Not available/Not applicable
PBT: Persistent, Bioaccumulative, and Toxic

Sources of Screening Levels and Heirarchy for Selection:
a - Ohio Water Quality Criteria (Reg 3745-1-07)
b - USEPA Recommended Water Quality Criteria (USEPA, Decmber 2002)

Rationale Codes:
For Selection as a COPC:
ASL = Above Screening Level
NTX = No Toxicity Data Available/Screening Level not Available

For Elimination as a COPC:
BSL = At or Below COPC Screening Level
BKG = At or less than the Background Concentration
NUT = Essential Nutrient

COPEC = Chemical of potential ecological concern.
SERA = Screening ecological risk assessment.

Table H-4. Historical SERA Findings for Earthworms

DIRECT TOXICITY TO EARTHWORMS
Upper and Lower Cobbs Ponds Phase II Remedial Investigation
Ravenna Army Ammunition Plant, Ravenna, Ohio

Parameter	Frequency of Detection	Maximum Concentration	Average Concentration	Selected Upper Confidence Level	Earthworm Toxicity Benchmarks	Source	Maximum > TRV?	Average > TRV?
Energetics (mg/kg)								
Nitrocellulose	1/1	1.5	1.08	1.08	No TRV	NA	No TRV	Nc TRV
Inorganics (mg/kg)								
Aluminum	10/10	19200	13350	15488	pH[(1)]	a	No TRV	Nc TRV
Arsenic	10/10	16.9	10.6	13.3	60	b	NO	NO
Chromium	10/10	24.8	16.7	20.4	78	c	NO	NO
Iron	10/10	44000	23400	31277	No TRV	NA	NA	NA
Mercury	10/10	0.066	0.04	0.044	12	c	NO	NO
Vanadium	10/10	35.3	23.2	26.7	130	c	NO	NO
Zinc	10/10	81.1	64.0	70.9	200	c	NO	NO
Miscellaneous Parameters (mg/kg)								
Nitrate, as N	1/10	1.4	0.55	1.4	No TRV	NA	No TRV	Nc TRV

Notes:
- Average concentration includes positive detections and non-detected results. Detection limits are divided by two.
- Frequency of detection refers to number of times compound was detected among all samples versus total number of samples analyzed for that parameter.
- Number of samples may vary based on the number of usable results.

1 - Benchmark for iron is based on the pH of the soil.

Acronyms:
TRV: Toxicity Reference Value
NA: Not applicable/Not available

Sources of Earthworm Toxicity Benchmarks:
a - Ecological Soil Screening Level (Eco-SSL) from U.S. EPA, (November 2003b).
b - Earthworm toxicity benchmark from Efroymson et al., 1997b.
c - Canadian Soil Quality Guideline (SQG) from Environment Canada (EC, 1999a-d).

SERA = Screening ecological risk assessment.

Table H-5. Historical SERA Findings for Plants

DIRECT TOXICITY TO PLANTS
Upper and Lower Cobbs Ponds Phase II Remedial Investigation
Ravenna Army Ammunition Plant, Ravenna, Ohio

Parameter	Frequency of Detection	Maximum Concentration	Average Concentration	Selected Upper Confidence Level	Plant Toxicity Benchmarks	Source	Maximum > TRV?	Average > TRV?
Energetics (mg/kg)								
Nitrocellulose	1/1	1.5	1.08	1.08	No TRV	NA	No TRV	No TRV
Inorganics (mg/kg)								
Aluminum	10/10	19200	13350	15488	pH[(1)]	a	NA	NA
Arsenic	10/10	16.9	10.6	13.3	17.1	c	NO	NO
Chromium	10/10	24.8	16.7	20.4	78	c	NO	NO
Iron	10/10	44000	23400	31277	pH[(1)]	a	NA	NA
Mercury	10/10	0.066	0.04	0.044	12	c	NO	NO
Vanadium	10/10	35.3	23.2	26.7	130	c	NO	NO
Zinc	10/10	81.1	64.0	70.9	200	c	NO	NO
Miscellaneous Parameters (mg/kg)								
Nitrate, as N	1/10	1.4	0.55	1.4	No TRV	NA	No TRV	No TRV

Notes:
- Average concentration includes positive detections and non-detected results. Detection limits are divided by two.
- Frequency of detection refers to number of times compound was detected among all samples versus total number of samples analyzed for that parameter.
- Number of samples may vary based on the number of usable results.

1 - Benchmarks for aluminum and iron are based on the pH of the soil.

Acronyms:
TRV: Toxicity Reference Value
NA: Not applicable/Not available

Sources of Plant Toxicity Benchmarks:
a - Ecological Soil Screening Level (Eco-SSL) from U.S. EPA, (November 2003a, b).
b - Plant toxicity benchmark from Efroymson et al., 1997c.
c - Canadian Soil Quality Guideline (SQG) from Environment Canada (EC, 1999a-e).

SERA = Screening ecological risk assessment.

Table H-6. Historical SERA Findings for Terrestrial Receptors for the Conservative Scenario

TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
INSECTIVOROUS, HERBIVOROUS, AND CARNIVOROUS RECEPTORS
Upper and Lower Cobbs Ponds Phase II Remedial Investigation
Ravenna Army Ammunition Plant, Ravenna, Ohio

Chemical	Herbivorous Receptors HQs		Insectivorous Receptors HQs				Carnovorous Receptors HQs					
	Meadow Vole		American Robin		Short-tailed Shrew		Barn Owl		Red Fox		Red-Tailed Hawk	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Energetics												
NITROCELLULOSE	No TRV	No TRV	No TRV	No TRV	No TRV	No TRV	NC	NC	NC	NC	NC	NC
Inorganics												
ARSENIC	5.6E+00	5.6E-01	1.7E-01	1.7E-02	7.1E+00	7.1E-01	NC	NC	NC	NC	NC	NC
CADMIUM	1.6E-02	1.6E-03	5.4E-01	5.4E-02	3.1E-01	3.1E-02	NC	NC	NC	NC	NC	NC
CHROMIUM	1.6E-04	1.6E-05	3.2E+00	3.2E-01	5.3E-04	5.3E-05	NC	NC	NC	NC	NC	NC
COPPER	1.5E-01	1.5E-02	9.1E-02	9.1E-03	1.1E-01	1.1E-02	NC	NC	NC	NC	NC	NC
MERCURY	6.7E-03	6.7E-04	2.8E-02	2.8E-03	4.0E-03	4.0E-04	1.2E-01	1.2E-02	1.9E-02	1.9E-03	4.8E-02	4.8E-03
NICKEL	1.9E-02	1.9E-03	6.3E-02	6.3E-03	5.2E-02	5.2E-03	NC	NC	NC	NC	NC	NC
SILVER	No TRV	No TRV	No TRV	No TRV	No TRV	No TRV	NC	NC	NC	NC	NC	NC
ZINC	1.4E-01	1.4E-02	6.1E+00	6.1E-01	2.0E-01	2.0E-02	NC	NC	NC	NC	NC	NC

Cells are shaded if the value is greater than 1.0
NC - Not calculated because the food chain model for carnivorous receptors is only done for persistent, bioaccumulative, and toxic chemicals.

HQ = Hazard quotient.
LOAEL = Lowest observed adverse effect level.
NOAEL = No observable adverse effect level.
SERA = Screening ecological risk assessment.
TRV = Toxicity reference value.

Table H-7. Historical SERA Findings for Terrestrial Receptors for the Average Scenario

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
INSECTIVOROUS, HERBIVOROUS AND CARNIVOROUS RECEPTORS
Upper and Lower Cobbs Ponds Phase II Remedial Investigation
Ravenna Army Ammunition Plant, Ravenna, Ohio

Chemical	Herbivorous Receptors HQs		Insectivorous Receptors HQs				Carnovorous Receptors HQs					
	Meadow Vole		American Robin		Short-tailed Shrew		Barn Owl		Red Fox		Red-Tailed Hawk	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics												
ARSENIC	4.4E+00	4.4E-01	1.3E-01	1.3E-02	5.6E+00	5.6E-01	NC	NC	NC	NC	NC	NC
CHROMIUM	1.3E-04	1.3E-05	2.6E+00	2.6E-01	4.3E-04	4.3E-05	NC	NC	NC	NC	NC	NC
SILVER	No TRV	No TRV	No TRV	No TRV	No TRV	No TRV	NC	NC	NC	NC	NC	NC
ZINC	1.3E-01	1.3E-02	5.5E+00	5.5E-01	1.8E-01	1.8E-02	NC	NC	NC	NC	NC	NC

Cells are shaded if the value is greater than 1.0
NC - Not calculated because the food chain model for carnivorous receptors is only done for persistent, bioaccumulative, and toxic chemicals.

HQ = Hazard quotient.
LOAEL = Lowest observed adverse effect level.
NOAEL = No observable adverse effect level
SERA = Screening ecological risk assessment.
TRV = Toxicity reference value.

Table H-8. Historical SERA Findings for Sediment Invertebrates

STEP 3A TABLE FOR EVALUATING RISKS TO SEDIMENT INVERTEBRATES
Upper and Lower Cobbs Pond Phase II Remedial Investigation
Ravenna Army Ammunition Plant, Ravenna, Ohio

Chemical of Potential Concern (COPC)[1]	Frequency of Detection	Maximum Concentration	Average Concentration	Screening Level Comparison		Higher Effects-Level Comparison			
				Screening Level[2]	Average> Screening Level	Higher Effects Level	Source	Maximum> Higher Effects Level	Average> Higher Effects Level
Semivolatile Organic Compounds (mg/kg)									
2,6-Dinitrotoluene	1/27	0.16	0.029	0.021	YES	NA	NA	NA	NA
Anthracene	1/5	0.22	0.10	0.057	YES	0.845	a	NO	NO
Benzo(a)anthracene	1/5	0.83	0.21	0.11	YES	1.05	a	NO	NO
Benzo(a)pyrene	2/5	0.89	0.26	0.15	YES	1.45	a	NO	NO
Benzo(g,h,i)perylene	1/5	0.49	0.22	0.17	YES	6.4[3]	b	NO	NO
Benzo(k)fluoranthene	1/5	0.8	0.25	0.24	YES	26.8[3]	b	NO	NO
Chrysene	2/5	0.93	0.26	0.17	YES	1.29	a	NO	NO
Fluoranthene	1/5	1.8	0.44	0.42	YES	2.23	a	NO	NO
Indeno(1,2,3-cd)pyrene	1/5	0.48	0.18	0.2	NO	6.4[3]	b	NO	NO
Phenanthrene	1/5	0.91	0.24	0.042	YES	1.17	a	NO	NO
Pyrene	1/5	1.9	0.49	0.20	YES	1.52	a	NO	NO
Total PAHs	1/5	10.1	2.9	1.61	YES	22.8	a	NO	NO
Energetics (mg/kg)									
2,4,6-TNT	6/27	0.32	0.045	NA	NA	NA	NA	NA	NA
Nitrocellulose	3/3	3	2.52	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)									
Antimony	15/27	1.4	0.40	NA	NA	3.0	c	NO	NO
Arsenic	27/27	34.3	12.5	9.79	YES	33	a	YES	NO
Beryllium	27/27	1.4	0.80	NA	NA	NA	NA	NA	NA
Cadmium	23/27	7.3	1.04	0.99	YES	4.98	a	YES	NO
Chromium	27/27	150	34.2	43.4	NO	111	a	YES	NO
Copper	27/27	149	37.2	31.6	YES	149	a	NO	NO
Cyanide, Total	6/27	1.2	0.27	0.0001	YES	NA	NA	NA	NA
Lead	27/27	60.4	29.8	35.8	NO	128	a	NO	NO
Nickel	27/27	35.4	20.8	22.7	NO	48.6	a	NO	NO
Silver	20/27	130	8.81	0.5	YES	4.5	c	YES	YES
Miscellaneous Parameters (mg/kg)									
Nitrate, as N	2/27	13	1.18	NA	NA	NA	NA	NA	NA

Footnotes:
1 - This table only presents that chemicals that were retained as COPCs because the maximum detected concentration exceeded the screening level or the chemical did not have a screening level.
2 - Table 2 presents the source of the screening levels.
3 - Value is based on a TOC of 2%.

Acronyms:
COPC: Chemical of Potential Concern
NA: Not applicable/not available

Sources of Higher Effects Levels:
a - Probable Effects Concentration from MacDonald et al., 2000.
b - Severe Effect Level from OMOE, 1993.
c - Upper Effects Threshold from Buchman 1999.

SERA = Screening ecological risk assessment.

Table H-9. Historical SERA Findings for Aquatic Receptors for the Conservative Scenario

AQUATIC FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
PISCIVOROUS RECEPTORS
Upper and Lower Cobbs Ponds Phase II Remedial Investigation
Ravenna Army Ammunition Plant, Ravenna, Ohio

Chemical	Piscivorous Receptor HQs					
	Great Blue Heron		Kingfisher		Mink	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Pesticides PCBs						
AROCLOR-1254	1.7E-01	1.7E-02	4.7E-01	4.7E-02	1.2E+00	1.2E-01
Inorganics						
MERCURY	1.2E-02	1.2E-03	3.3E-02	3.3E-03	4.7E-03	4.7E-04

Cells are shaded if the value is greater than 1.0

HQ = Hazard quotient.
LOAEL = Lowest observed adverse effect level.
NOAEL = No observable adverse effect level.
PCB = Polychlorinated biphenyl.
SERA = Screening ecological risk assessment.

Table H-10. Historical SERA Findings for Aquatic Receptors for the Average Scenario

AQUATIC FOOD CHAIN MODEL - AVERAGE SCENARIO
PISCIVOROUS RECEPTORS
Upper and Lower Cobbs Ponds Phase II Remedial Investigation
Ravenna Army Ammunition Plant, Ravenna, Ohio

Chemical	Piscivorous Receptor HQs					
	Great Blue Heron		Kingfisher		Mink	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Pesticides PCBs						
AROCLOR-1254	1.5E-01	1.5E-02	4.2E-01	4.2E-02	1.0E+00	1.0E-01
Inorganics						
MERCURY	8.9E-03	8.9E-04	2.4E-02	2.4E-03	3.4E-03	3.4E-04

Cells are shaded if the value is greater than 1.0

HQ = Hazard quotient.
LOAEL = Lowest observed adverse effect level.
NOAEL = No observable adverse effect level.
PCB = Polychlorinated biphenyl.
SERA = Screening ecological risk assessment.

Table H-11. Checklist of Important Ecological Places and Resources at Upper and Lower Cobbs Ponds AOC

Resource	Army (2005)	Ohio EPA (2008)	Upper and Lower Cobbs Ponds	
			Absent	Present
National park	X	X	X	
Designated federal wilderness area	X	X	X	
National lakeshore recreational area	X	X	X	
Habitat known to be used by federal designated or proposed threatened or endangered species	X	X	X	
National or state wildlife refuge	X	X	X	
Federal land designated for protection of natural ecosystems	X	X	X	
Habitat known to be used by state designated threatened or endangered species	X	X		X
Federally designated scenic or wild river	X	X	X	
State land designated for wildlife or game management	X	X	X	
State-designated scenic or wild river	X	X	X	
Wetlands and waters of the state[a]	X	X		X
National preserve	X	X[b]	X	
State-designated natural areas	X	X[b]	X	
Spawning areas critical for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters	X	X[c]	X	
Migratory pathways and feeding areas critical for maintenance of anadromous fish species[d]	X	X[c]	X	
Terrestrial areas used for breeding by large or dense aggregations of animals	X	X[c]	X	
Particular areas, relatively small in size, important to maintenance of unique biotic communities[e]	X	X[c]	X	
Locally important ecological place[f]	X		X	
Critical habitat for federal designated threatened or endangered species	X		X	
Marine Sanctuary	X		X	
Areas identified under the Coastal Zone Management Act	X		X	
Sensitive areas identified under the National Estuary Program or Near Coastal Waters Program	X		X	
Critical areas identified under the Clean Lakes Program	X		X	
National monument	X		X	
National seashore recreational area	X		X	
Unit of coastal barrier resources system	X		X	
Coastal barrier (undeveloped)	X		X	
Coastal barrier (partially developed)	X		X	
Administratively proposed federal wilderness area	X		X	
National river reach designated as recreational	X		X	
Habitat known to be used by species under review as to its federal threatened or endangered status	X		X	
State-designated areas for protection or maintenance of aquatic life	X		X	
Fragile landscapes, land sensitive to degradation if vegetative habitat or cover diminishes	X		X	
State, local, or private land designated for protection of natural ecosystems		X	X	

Table H-11. Checklist of Important Ecological Places and Resources at Upper and Lower Cobbs Ponds AOC (continued)

Resource	Army (2005)	Ohio EPA (2008)	Upper and Lower Cobbs Ponds	
			Absent	Present
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
Federally listed or state-listed threatened or endangered species		X		X
State of Ohio special interest or declining species and its associated habitat		X	X	
State park		X	X	

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

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

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

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

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

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

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

[f]The Ohio Army National Guard (OHARNG) INRMP (OHARNG 2014) has five special interest areas (important resources) at the Ravenna Army Ammunition Plant: Unit 1 – mixed valuable communities, Unit 2 – Hemlock Ravine-Wadsworth Glen, Unit 3 – mixed mature woods, Unit 4 – oak/maple swamp forest, and Unit 5 – mixed swamp forest. Also, OHARNG recognizes the importance of federal- and state-listed threatened and endangered plant and animal species.

x = Designated as important and, **when bolded**, **there are possible qualifiers**.

AOC = Area of concern.

OAC = Ohio Administrative Code.

Ohio EPA = Ohio Environmental Protection Agency.

Table H-12. Natural Resources Management Goals (OHARNG 2014)

Goals and Objectives of OHARNG	Comments on Goals Relative to HTRW Work at RVAAP
Goal 1. Manage natural resources in a manner that is compatible with and supports the military mission while complying with applicable federal and state laws and Army regulations and policies. Objective 1.1: Initiate programs and projects that enhance the training land and training opportunities and/or do not unnecessarily limit training land availability. Objective 1.2: Continue to educate Camp Ravenna users regarding the natural resources at the Camp Ravenna and their part in ensuring sustainable use of the site in perpetuity.	The 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 Army works and coordinates with other federal and state agencies as necessary if mission or projects have the potential to impact natural resources.
Goal 3. Monitor the condition of the natural resources and the implied impacts from training and the natural resources management program on the natural resources at the Camp Ravenna. Objective 3.1: Maintain current species inventories and other PLSs through periodic reoccurring surveys and inventories.	The Army conducts natural resource management activities at the facility to monitor potential impacts from training or other disturbance activities.
Goal 4. Protect and maintain populations of rare plant and animal species on the Camp Ravenna in compliance with federal and state laws and regulations. Objective 4.1: Avoid negative impacts to federally listed species and avoid/minimize impacts to state listed and otherwise rare species.	The 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-12. Natural Resources Management Goals (OHARNG 2014) (continued)

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

Table H-12. Natural Resources Management Goals (OHARNG 2014) (continued)

Goals and Objectives of OHARNG	Comments on Goals Relative to HTRW Work at RVAAP
Goal 7. Manage the Camp Ravenna whitetail deer population in a manner that minimizes impacts on the military mission, is ecologically sustainable, provides for public hunting, and is in accordance with Army regulations and state law. Objective 7.1: Census the deer herd. Objective 7.2: Determine winter carrying capacity for whitetail deer at Camp Ravenna. Objective 7.3: Maintain the whitetailed 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 Army manages populations of whitetailed deer by implementing a natural resource management plan at the facility in a manner that is compatible with and supports the military mission and complies with state laws and Army regulations and policies.
Goal 8. Manage forest resources to the benefit of the military mission, to perpetuate the ecosystem functions, to support regional ecosystem needs, and for the production of forest products. Objective 8.1: Maintain current forest resource data. Objective 8.2: Implement forest management strategies identified in the Camp Ravenna INRMP.	The Army sustains and manages forest resources by implementing a natural resource management plan. During HTRW activities, efforts are made by the Army to minimize impacts to forest communities.
Goal 9. Manage wetlands and other surface waters in accordance with applicable federal, state, and local regulations and to protect water quality and ecological functions while facilitating the military mission. Objective 9.1: Avoid wetland fills. 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 the Camp Ravenna can support doctrinally required military training in perpetuity. Objective 10.1: Conduct training and other activities in locations with soil most suitable for supporting the activity. Objective 10.2: Rehabilitate, repair, and maintain areas damaged by training and other activities.	Management of soil relevant to remedial activities under CERCLA. Appropriate storm water and erosion controls are to be utilized during activities that require ground disturbance.

Table H-12. Natural Resources Management Goals (OHARNG 2014) (continued)

Goals and Objectives of OHARNG	Comments on Goals Relative to HTRW Work at RVAAP
Goal 11. Manage cultural resources on the Camp Ravenna in accordance with state and federal laws and regulations while implementing the natural resources management program. Objective 11.1: Comply with federal, state, and local laws and regulations pertaining to cultural resources found on the training site.	The Army utilizes a cultural resource management plan to manage and protect cultural resources at the facility. Coordination with state and federal agencies regarding cultural resources is conducted as necessary. Restoration contractors are also advised to utilize the Camp Ravenna Policy for Inadvertent Discoveries for reporting purposes should they come upon a cultural item.
Goal 12. Develop, maintain, and manage data regarding natural resources at the Camp Ravenna through the use of GIS for efficient data storage, retrieval, analysis, and presentation. Objective 12.1: Develop accurate and usable natural resources GIS data.	Natural resource data are collected and managed by the OHARNG. This 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-13. SRVs 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 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-14. ESVs for Chemical Analytes in Soil

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

Table H-14. ESVs for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) PRGs for Ecological Endpoints[a]		USEPA Reg 5 ESLs (2003) (update of 1998 EDQLs)		Preferred ESV[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
Lead	7439-92-1	11	avian EcoSSL for Pb	40.5	PRGs	0.0537	USEPA Reg 5	1.10E+01	avian EcoSSL for Pb
Lithium	7439-93-2	--	--	2	PRGs	--	--	2.00E+00	PRGs
Magnesium	7439-95-4	--	--	--	--	--	--	No ESV	No Source
Manganese	7439-96-5	220	plant EcoSSL for Mn	500	PRGs[b]	--	--	2.20E+02	plant EcoSSL for Mn
Mercury	7439-97-6	--	--	0.00051	PRGs	0.1	USEPA Reg 5	5.10E-04	PRGs
Mercury, methyl	22967-92-6	--	--	--	--	0.00158	USEPA Reg 5	1.58E-03	USEPA Reg 5
Molybdenum	7439-98-7	--	--	2	PRGs	--	--	2.00E+00	PRGs
Nickel	7440-02-0	38	plant EcoSSL for Ni	30	PRGs	13.6	USEPA Reg 5	3.80E+01	plant EcoSSL for Ni
Potassium	7440-09-7	--	--	--	--	--	--	No ESV	No Source
Selenium	7782-49-2	0.52	plant EcoSSL for Se	0.21	PRGs	0.0276	USEPA Reg 5	5.20E-01	plant EcoSSL for Se
Silver	7440-22-4	4.2	avian EcoSSL for Ag	2	PRGs	4.04	USEPA Reg 5	4.20E+00	avian EcoSSL for Ag
Sodium	7440-23-5	--	--	--	--	--	--	No ESV	No Source
Technetium	7440-26-8	--	--	0.2	PRGs	--	--	2.00E-01	PRGs
Tellurium	13494-80-9	--	--	--	--	--	--	No ESV	No Source
Thallium	7440-28-0	--	--	1	PRGs	0.0569	USEPA Reg 5	1.00E+00	PRGs
Tin	7440-31-5	--	--	50	PRGs	7.62	USEPA Reg 5	5.00E+01	PRGs
Titanium	7440-32-6	--	--	--	--	--	--	No ESV	No Source
Tungsten	7440-33-7	--	--	--	--	--	--	No ESV	No Source
Uranium	7440-61-1	--	--	5	PRGs	--	--	5.00E+00	PRGs
Vanadium	7440-62-2	7.8	avian EcoSSL for V	2	PRGs	1.59	USEPA Reg 5	7.80E+00	avian EcoSSL for V
Zinc	7440-66-6	46	avian EcoSSL for Zn	8.5	PRGs	6.62	USEPA Reg 5	4.60E+01	avian EcoSSL for Zn
Anions									
Nitrate	14797-55-8	--	--	--	--	--	--	No ESV	No Source
Sulfide	18496-25-8	--	--	--	--	0.00358	USEPA Reg 5	3.58E-03	USEPA Reg 5

Table H-14. ESVs for Chemical Analytes in Soil (continued)

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

Table H-14. ESVs for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) PRGs for Ecological Endpoints[a]		USEPA Reg 5 ESLs (2003) (update of 1998 EDQLs)		Preferred ESV[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
Benzo(k)fluoranthene	207-08-9	--	--	--	--	148	USEPA Reg 5	1.48E+02	USEPA Reg 5
Benzoic Acid	65-85-0	--	--	--	--	--	--	No ESV	No Source
BHC	608-73-1	--	--	--	--	--	--	No ESV	No Source
BHC, alpha	319-84-6	--	--	--	--	0.0994	USEPA Reg 5	9.94E-02	USEPA Reg 5
BHC, beta	319-85-7	--	--	--	--	0.00398	USEPA Reg 5	3.98E-03	USEPA Reg 5
BHC, delta	319-86-8	--	--	--	--	9.94	USEPA Reg 5	9.94E+00	USEPA Reg 5
BHC, gamma (Lindane)	58-89-9	--	--	--	--	0.005	USEPA Reg 5	5.00E-03	USEPA Reg 5
Biphenyl	92-52-4	--	--	60	PRGs	--	--	6.00E+01	PRGs
bis(2-chloroethoxy) methane	111-91-1	--	--	--	--	0.302	USEPA Reg 5	3.02E-01	USEPA Reg 5
bis(2-Chloroethyl) ether	111-44-4	--	--	--	--	23.7	USEPA Reg 5	2.37E+01	USEPA Reg 5
bis(2-Ethylhexyl)phthalate	117-81-7	--	--	--	--	0.925	USEPA Reg 5	9.25E-01	USEPA Reg 5
4-Bromoaniline	106-40-1	--	--	--	--	--	--	No ESV	No Source
Bromodichloromethane	75-27-4	--	--	--	--	0.54	USEPA Reg 5	5.40E-01	USEPA Reg 5
Bromoform	75-25-2	--	--	--	--	15.9	USEPA Reg 5	1.59E+01	USEPA Reg 5
Bromomethane	74-83-9	--	--	--	--	0.235	USEPA Reg 5	2.35E-01	USEPA Reg 5
4-bromophenyl-phenylether	101-55-3	--	--	--	--	--	--	No ESV	No Source
2-Butanone	78-93-3	--	--	--	--	89.6	USEPA Reg 5	8.96E+01	USEPA Reg 5
Butylbenzyl phthalate	85-68-7	--	--	--	--	0.239	USEPA Reg 5	2.39E-01	USEPA Reg 5
N-Nitrosodi-n-Butylamine	924-16-3	--	--	--	--	0.267	USEPA Reg 5	2.67E-01	USEPA Reg 5
Carbazole	86-74-8	--	--	--	--	--	--	No ESV	No Source
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

Table H-14. ESVs for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) PRGs for Ecological Endpoints[a]		USEPA Reg 5 ESLs (2003) (update of 1998 EDQLs)		Preferred ESV[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
Chloroform	67-66-3	--	--	--	--	1.19	USEPA Reg 5	1.19E+00	USEPA Reg 5
Chloromethane	74-87-3	--	--	--	--	10.4	USEPA Reg 5	1.04E+01	USEPA Reg 5
2-Chloronaphthalene	91-58-7	--	--	--	--	0.0122	USEPA Reg 5	1.22E-02	USEPA Reg 5
2-Chlorophenol	95-57-8	--	--	--	--	0.243	USEPA Reg 5	2.43E-01	USEPA Reg 5
3-Chlorophenol	108-43-0	--	--	7	PRGs	--	--	7.00E+00	PRGs
4-Chlorophenol	106-48-9	--	--	--	--	--	--	No ESV	No Source
4-Chlorophenyl-phenyl ether	7005-72-3	--	--	--	--	--	--	No ESV	No Source
4-Chloro-3-methylphenol	59-50-7	--	--	--	--	7.95	USEPA Reg 5	7.95E+00	USEPA Reg 5
Chloropropene	107-05-1	--	--	--	--	0.0134	USEPA Reg 5	1.34E-02	USEPA Reg 5
Chloroprene	126-99-8	--	--	--	--	0.0029	USEPA Reg 5	2.90E-03	USEPA Reg 5
Chrysene	218-01-9	--	--	--	--	4.73	USEPA Reg 5	4.73E+00	USEPA Reg 5
m-Cresol	108-39-4	--	--	--	--	3.49	USEPA Reg 5	3.49E+00	USEPA Reg 5
2,4-D	94-75-7	--	--	--	--	0.0272	USEPA Reg 5	2.72E-02	USEPA Reg 5
4,4'-DDD	72-54-8	0.021	mammalian EcoSSL for DDT and metabolites	--	--	0.758	USEPA Reg 5	2.10E-02	mammalian EcoSSL for DDT and metabolites
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

Table H-14. ESVs for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) PRGs for Ecological Endpoints[a]		USEPA Reg 5 ESLs (2003) (update of 1998 EDQLs)		Preferred ESV[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
Dibromochloromethane	124-48-1	--	--	--	--	2.05	USEPA Reg 5	2.05E+00	USEPA Reg 5
Dibromoethane	106-93-4	--	--	--	--	1.23	USEPA Reg 5	1.23E+00	USEPA Reg 5
2,4-Dichloroaniline	554-00-7	--	--	100	PRGs[c]	--	--	1.00E+02	PRGs
3,4-Dichloroaniline	95-76-1	--	--	20	PRGs[c]	--	--	2.00E+01	PRGs
1,2-Dichlorobenzene	95-50-1	--	--	--	--	2.96	USEPA Reg 5	2.96E+00	USEPA Reg 5
1,3-Dichlorobenzene	541-73-1	--	--	--	--	37.7	USEPA Reg 5	3.77E+01	USEPA Reg 5
1,4-Dichlorobenzene	106-46-7	--	--	20	PRGs	0.546	USEPA Reg 5	2.00E+01	PRGs
3,3'-Dichlorobenzidine	91-94-1	--	--	--	--	0.646	USEPA Reg 5	6.46E-01	USEPA Reg 5
Cis-1,4-dichloro-2-butene	1476-11-5	--	--	--	--	--	--	No ESV	No Source
Trans-1,4-dichloro-2-butene	110-57-6	--	--	--	--	--	--	No ESV	No Source
Dichlorodifluromethane	75-71-8	--	--	--	--	39.5	USEPA Reg 5	3.95E+01	USEPA Reg 5
1,1-Dichloroethane	75-34-3	--	--	--	--	20.1	USEPA Reg 5	2.01E+01	USEPA Reg 5
1,2-Dichloroethane	107-06-2	--	--	--	--	21.2	USEPA Reg 5	2.12E+01	USEPA Reg 5
1,1-Dichloroethene	75-35-4	--	--	--	--	8.28	USEPA Reg 5	8.28E+00	USEPA Reg 5
1,2-Dichloroethene	540-59-0	--	--	--	--	0.784	USEPA Reg 5 (for trans form)	7.84E-01	USEPA Reg 5 (for trans form)
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

Table H-14. ESVs for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) PRGs for Ecological Endpoints[a]		USEPA Reg 5 ESLs (2003) (update of 1998 EDQLs)		Preferred ESV[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
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
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

Table H-14. ESVs for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) PRGs for Ecological Endpoints[a]		USEPA Reg 5 ESLs (2003) (update of 1998 EDQLs)		Preferred ESV[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
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
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

Table H-14. ESVs for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) PRGs for Ecological Endpoints[a]		USEPA Reg 5 ESLs (2003) (update of 1998 EDQLs)		Preferred ESV[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
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
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

Table H-14. ESVs for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) PRGs for Ecological Endpoints[a]		USEPA Reg 5 ESLs (2003) (update of 1998 EDQLs)		Preferred ESV[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
Pentachlorophenol	87-86-5	2.1	avian EcoSSL for PCP	3	PRGs	0.119	USEPA Reg 5	2.10E+00	avian EcoSSL for PCP
PETN	78-11-5	--	--	--	--	--	--	No ESV	No Source
Phenacetin	62-44-2	--	--	--	--	11.7	USEPA Reg 5	1.17E+01	USEPA Reg 5
Phenanthrene	85-01-8	--	--	--	--	45.7	USEPA Reg 5	4.57E+01	USEPA Reg 5
Phenol	108-95-2	--	--	30	PRGs	120	USEPA Reg 5	3.00E+01	PRGs
p-Phenylenediamine	106-50-3	--	--	--	--	6.16	USEPA Reg 5	6.16E+00	USEPA Reg 5
Phorate	298-02-2	--	--	--	--	0.0005	USEPA Reg 5	4.96E-04	USEPA Reg 5
2-Picoline	109-06-8	--	--	--	--	9.9	USEPA Reg 5	9.90E+00	USEPA Reg 5
PCBs	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
PAHs	130498-29-2	1.1	mammalian EcoSSL for HMW PAHs	--	--	--	--	1.10E+00	mammalian EcoSSL for HMW PAHs
Pronamide	23950-58-5	--	--	--	--	0.0136	USEPA Reg 5	1.36E-02	USEPA Reg 5
Propionitrile	107-12-0	--	--	--	--	0.0498	USEPA Reg 5	4.98E-02	USEPA Reg 5
4-Nitrotoluene	99-99-0	--	--	--	--	--	--	No ESV	No Source
Pyrene	129-00-0	--	--	--	--	78.5	USEPA Reg 5	7.85E+01	USEPA Reg 5
Pyridine	110-86-1	--	--	--	--	1.03	USEPA Reg 5	1.03E+00	USEPA Reg 5
RDX	121-82-4	--	--	--	--	--	--	No ESV	No Source
Safrole	94-59-7	--	--	--	--	0.404	USEPA Reg 5	4.04E-01	USEPA Reg 5
Silvex (2,4,5-TP)	93-72-1	--	--	--	--	0.109	USEPA Reg 5	1.09E-01	USEPA Reg 5
Styrene	100-42-5	--	--	300	PRGs	4.69	USEPA Reg 5	3.00E+02	PRGs
TCDD (2,3,7,8-Tetrachlorodibenzo-p-dioxin)	1746-01-6	--	--	3.15E-06	PRGs	2E-07	USEPA Reg 5	3.15E-06	PRGs
TCDF	51207-31-9	--	--	8.40E-04	PRGs	3.9E-05	USEPA Reg 5	8.40E-04	PRGs
2,3,5,6-Tetrachloroaniline	3481-20-7	--	--	20	PRGs	--	--	2.00E+01	PRGs
1,2,4,5-Tetrachlorobenzene	95-94-3	--	--	--	--	2.02	USEPA Reg 5	2.02E+00	USEPA Reg 5
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

Table H-14. ESVs for Chemical Analytes in Soil (continued)

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

Table H-14. ESVs for Chemical Analytes in Soil (continued)

Analyte	CAS Registry Number	Soil Screening Values							
		USEPA EcoSSLs		DOE (1997a) PRGs for Ecological Endpoints[a]		USEPA Reg 5 ESLs (2003) (update of 1998 EDQLs)		Preferred ESV[d]	
		Number (mg/kg dry soil)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source	Number (mg/kg)	Source
Xylenes (total)	1330-20-7	--	--	--	--	10	USEPA Reg 5	1.00E+01	USEPA Reg 5

Hierarchy of values found in updated Ohio Environmental Protection Agency 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/ESLs, 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. http://www.esd.ornl.gov/programs/ecorisk/documents/tm162r2.pdf

[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.

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

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

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

-- = No value.
BHC = Hexachlorocyclohexane.
CAS = Chemical Abstract Service.
DDD = Dichlorodiphenyldichloroethane.
DDE = Dichlorodiphenyldichloroethylene.
DDT = Dichlorodiphenyltrichloroethane.
EcoSSL = Ecological soil screening level.
EDQL = Ecological data quality level.
ESL = Ecolocial screening level.
ESV = Ecological screening value.
HMW = High molecular weight.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
mg/kg = Milligrams per kilogram.
PAH = Polycyclic aromatic hydrocarbon.
PCB = Polychlorinated biphenyl.
PCDD = Pentachlrorodibenzodiozin.
PCP = Pentachlorophenol.
PETN = Pentaerythritol tetranitrate.
PRG = Preliminary remediation goal.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
Reg = Region.
USEPA = U.S. Environmental Protection Agency.
TCDD = Tetrachlorodibenzo-p-dioxin.
TCDF = Tetrachlorodibenzofuran.

Table H-15. ESVs for Chemical Analytes in Sediment

Analyte	CAS Registry Number	Sediment Screening Values					
		MacDonald et al.[a]		USEPA Reg 5 ESLs (2003)[b] (update of 1998 EDQLs)		Preferred ESV[c]	
		Number (mg/kg)	Reference	Number (mg/kg)	Reference	Number (mg/kg)	Reference
Inorganic Chemicals							
Aluminum	7429-90-5	--	--	--	--	No ESV	No Source
Antimony	7440-36-0	--	--	--	--	No ESV	No Source
Arsenic	7440-38-2	9.79	MacDonald et al.	9.79	USEPA Reg 5	9.79E+00	MacDonald et al.
Barium	7440-39-3	--	--	--	--	No ESV	No Source
Beryllium	7440-41-7	--	--	--	--	No ESV	No Source
Cadmium	7440-43-9	0.99	MacDonald et al.	0.99	USEPA Reg 5	9.90E-01	MacDonald et al.
Calcium	7440-70-2	--	--	--	--	No ESV	No Source
Chromium, trivalent	7440-47-3	43.4	MacDonald et al.	43.4	USEPA Reg 5	4.34E+01	MacDonald et al.
Chromium, hexavalent	-	--	--	--	--	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.

Table H-15. ESVs 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
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
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

Table H-15. ESVs 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
BHC, beta	319-85-7	--	--	0.005	USEPA Reg 5	5.00E-03	USEPA Reg 5
BHC, delta	319-86-8	--	--	71.5	USEPA Reg 5	7.15E+01	USEPA Reg 5
BHC, gamma (Lindane)	58-89-9	0.00237	MacDonald et al.	0.00237	USEPA Reg 5	2.37E-03	MacDonald et al.
Biphenyl	92-52-4	--	--	--	--	No ESV	No Source
Bis(2-chloroethoxy) methane	111-91-1	--	--	--	--	No ESV	No Source
Bis(2-Chloroethyl) ether	111-44-4	--	--	3.52	USEPA Reg 5	3.52E+00	USEPA Reg 5
Bis(2-Ethylhexyl)phthalate	117-81-7	--	--	0.182	USEPA Reg 5	1.82E-01	USEPA Reg 5
Bromodichloromethane	74-97-5	--	--	--	--	No ESV	No Source
Bromoform	75-25-2	--	--	0.492	USEPA Reg 5	4.92E-01	USEPA Reg 5
Bromomethane	74-83-9	--	--	0.0137	USEPA Reg 5	1.37E-02	USEPA Reg 5
4-Bromophenyl-phenylether	101-55-3	--	--	1.55	USEPA Reg 5	1.55E+00	USEPA Reg 5
2-Butanone	78-93-3	--	--	0.0424	USEPA Reg 5	4.24E-02	USEPA Reg 5
Butylbenzylphthalate	85-68-7	--	--	1.97	USEPA Reg 5	1.97E+00	USEPA Reg 5
Carbazole	86-74-8	--	--	--	--	No ESV	No Source
Carbon Disulfide	75-15-0	--	--	0.0239	USEPA Reg 5	2.39E-02	USEPA Reg 5
Carbon Tetrachloride	56-23-5	--	--	1.45	USEPA Reg 5	1.45E+00	USEPA Reg 5
Chlordane	57-74-9	0.00324	MacDonald et al.	0.00324	USEPA Reg 5	3.24E-03	MacDonald et al.
gamma-Chlordane	12789-03-6	--	--	0.00324	value for chlordane	3.24E-03	Value for chlordane
Total Organic Carbon	--	--	--	--	--	No ESV	No Source
4-Chloroaniline	106-47-8	--	--	0.146	USEPA Reg 5	1.46E-01	USEPA Reg 5
Chlorobenzene	108-90-7	--	--	0.291	USEPA Reg 5	2.91E-01	USEPA Reg 5
Chlorobenzilate	510-15-6	--	--	0.86	USEPA Reg 5	8.60E-01	USEPA Reg 5
Chloroethane	75-00-3	--	--	--	--	No ESV	No Source
Chloroform	67-66-3	--	--	0.121	USEPA Reg 5	1.21E-01	USEPA Reg 5
Chloromethane	74-87-3	--	--	--	--	No ESV	No Source
2-Chloronaphthalene	91-58-7	--	--	0.417	USEPA Reg 5	4.17E-01	USEPA Reg 5
2-Chlorophenol	95-57-8	--	--	0.0319	USEPA Reg 5	3.19E-02	USEPA Reg 5
4-Chlorophenyl-phenyl ether	7005-72-3	--	--	--	--	No ESV	No Source
4-Chloro-3-methylphenol	59-50-7	--	--	0.388	USEPA Reg 5	3.88E-01	USEPA Reg 5

Table H-15. ESVs 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
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
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

Table H-15. ESVs 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
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
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

Table H-15. ESVs 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
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
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

Table H-15. ESVs 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
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
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

Table H-15. ESVs 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
1,1,1-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 Reg 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 Reg 5 ESLs.

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

-- = No value.

BHC = Hexachlorocyclohexane.
CAS = Chemical Abstract Service.
DDD = Dichlorodiphenyldichloroethane.
DDE = Dichlorodiphenyldichloroethylene.
DDT = Dichlorodiphenyltrichloroethane.
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.
mg/kg = Milligrams per kilogram.
PAH = Polycyclic aromatic hydrocarbon.
PCB = Polychlorinated biphenyl.
PCDD = Pentachlrorodibenzodiozin.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
Reg = Region.
USEPA = U.S. Environmental Protection Agency.

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Table H-16. ESVs for Chemical Analytes in Surface Water

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio EPA Administrative Code (µg/L)[a]		Updated Values for Suter and Tsao 1996[b]				USEPA Region 5 ESLs (2003)[c] (update of 1998 EDQLs)		Preferred Surface Water Value[d]	
				NAWQC 2009 Update		Tier II Values					
		OMZM	OMZA	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
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)	--	--	2.00E+04	Ohio Administrative Code
Nickel (Diss)	7440-02-0	470	52	52	NAWQC 2009	--	--	--	--	5.20E+01	Ohio Administrative Code
Nickel (TR)	7440-02-1	470	52	--	--	--	--	28.9	USEPA Reg 5	5.20E+01	Ohio Administrative Code
Potassium	7440-09-7	--	--	--	--	--	--	--	--	No ESV	No Source
Selenium (Diss)	7782-49-2	--	4.6	4.6	NAWQC 2009	--	--	--	--	4.60E+00	Ohio Administrative Code
Selenium	7782-49-2	--	5	5	NAWQC 2009	--	--	5	USEPA Reg 5	5.00E+00	Ohio Administrative Code
Silver (Diss)	7440-22-4	1.4	--	--	--	0.12	Tier II (Suter & Tsao 1996)	--	--	1.40E+00	Ohio Administrative Code
Silver	7440-22-4	1.6	1.3	--	--	0.36	Tier II (Suter & Tsao 1996)	0.12	USEPA Reg 5	1.30E+00	Ohio Administrative Code
Sodium	7440-23-5	--	--	--	--	--	--	--	--	No ESV	No Source
Strontium	7440-24-6	40,000	21,000	--	--	1,500	Tier II (Suter & Tsao 1996)	--	--	2.10E+04	Ohio Administrative Code
Thallium	7440-28-0	79	17	--	--	12	Tier II (Suter & Tsao 1996)	10	USEPA Reg 5	1.70E+01	Ohio Administrative Code
Tin	7440-31-5	1,600	180	--	--	73	Tier II (Suter & Tsao 1996)	180	USEPA Reg 5	1.80E+02	Ohio Administrative Code
Uranium	7440-61-1	--	--	--	--	2.6	Tier II (Suter & Tsao 1996)	--	--	2.60E+00	Tier II (Suter & Tsao 1996)
Vanadium	7440-62-2	150	44	--	--	20	Tier II (Suter & Tsao 1996)	12	USEPA Reg 5	4.40E+01	Ohio Administrative Code
Zinc (Diss)	7440-66-6	120	120	120	NAWQC 2009	--	--	--	--	1.20E+02	Ohio Administrative Code

Table H-16. ESVs for Chemical Analytes in Surface Water (continued)

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio EPA Administrative Code (µg/L)[a]		Updated Values for Suter and Tsao 1996[b]				USEPA Region 5 ESLs (2003)[c] (update of 1998 EDQLs)		Preferred Surface Water Value[d]	
				NAWQC 2009 Update		Tier II Values					
		OMZM	OMZA	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
Inorganic Chemicals											
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
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

Table H-16. ESVs for Chemical Analytes in Surface Water (continued)

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio EPA Administrative Code (µg/L)[a]		Updated Values for Suter and Tsao 1996[b]				USEPA Region 5 ESLs (2003)[c] (update of 1998 EDQLs)		Preferred Surface Water Value[d]	
				NAWQC 2009 Update		Tier II Values					
		OMZM	OMZA	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
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	--	--	0.0000043	NAWQC 2009	--	--	0.0000043	USEPA Reg 5	4.30E-06	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
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)

Table H-16. ESVs for Chemical Analytes in Surface Water (continued)

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio EPA Administrative Code (µg/L)[a]		Updated Values for Suter and Tsao 1996[b]				USEPA Region 5 ESLs (2003)[c] (update of 1998 EDQLs)		Preferred Surface Water Value[d]	
				NAWQC 2009 Update		Tier II Values					
		OMZM	OMZA	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
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
Hexachlorophene	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	2691-41-0	1,200	220	--	--	220	Tier II (GLI database)	--	--	2.20E+02	Ohio Administrative Code
Hydroquinone	123-31-9	--	--	--	--	2.2	Tier II (GLI database)	--	--	2.20E+00	Tier II (GLI database)
Indeno(1,2,3-cd)pyrene	193-39-5	--	--	--	--	--	--	4.31	USEPA Reg 5	4.31E+00	USEPA Reg 5
Isodecyl diphenyl phosphate	29761-21-5	--	--	--	--	1.73	Tier II (GLI database)	--	--	1.73E+00	Tier II (GLI database)
Isodrin	465-73-6	--	--	--	--	--	--	0.0309	USEPA Reg 5	3.09E-02	USEPA Reg 5
Isophorone	78-59-1	7,500	920	--	--	920	Tier II (GLI database)	920	USEPA Reg 5	9.20E+02	Ohio Administrative Code
Isopropylbenzene	98-82-8	43	4.8	--	--	4.8	Tier II (GLI database)	--	--	4.80E+00	Ohio Administrative Code
4-Isopropyltoluene	99-87-6	150	16	--	--	16	Tier II (GLI database)	--	--	1.60E+01	Ohio Administrative Code
Kepone	143-50-0	--	--	--	--	--	--	0.132	USEPA Reg 5	1.32E-01	USEPA Reg 5
Malathion	121-75-5	--	--	0.1	NAWQC 2009	0.1	Tier II (GLI database)	--	--	1.00E-01	NAWQC 2009

Table H-16. ESVs for Chemical Analytes in Surface Water (continued)

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio EPA Administrative Code (µg/L)[a]		Updated Values for Suter and Tsao 1996[b]				USEPA Region 5 ESLs (2003)[c] (update of 1998 EDQLs)		Preferred Surface Water Value[d]	
				NAWQC 2009 Update		Tier II Values					
		OMZM	OMZA	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
MBAS (foaming agents, aesthetic criteria)	--	500	--	--	--	--	--	--	--	5.00E+02	Ohio Administrative Code
Methanol	67-56-1	--	--	--	--	330	Tier II (GLI database)	--	--	3.30E+02	Tier II (GLI database)
Methoxychlor	72-43-5	--	--	0.03	NAWQC 2009	0.03	Tier II (GLI database)	0.019	USEPA Reg 5	3.00E-02	NAWQC 2009
Methyl methacrylate	80-62-6	--	--	--	--	--	--	2,800	USEPA Reg 5	2.80E+03	USEPA Reg 5
4-Methyl-2-pentanone	108-10-1	--	--	--	--	--	--	170	USEPA Reg 5	1.70E+02	USEPA Reg 5
Methyl tert-butyl ether	1634-04-4	6,500	730	51,000	NAWQC 2009	730	Tier II (GLI database)	--	--	7.30E+02	Ohio Administrative Code
Methylamine	74-89-5	--	--	--	--	860	Tier II (GLI database)	--	--	8.60E+02	Tier II (GLI database)
3-Methylcholanthrene	56-49-5	--	--	--	--	--	--	0.0891	USEPA Reg 5	8.91E-02	USEPA Reg 5
Methylene chloride (dichloromethane)	75-09-2	11,000	1,900	--	--	2,200	Tier II (Suter & Tsao 1996)	940	USEPA Reg 5	1.90E+03	Ohio Administrative Code
Methylene dithiocyanate	6317-18-6	--	--	--	--	1	Tier II (GLI database)	--	--	1.00E+00	Tier II (GLI database)
2-Methylnaphthalene	91-57-6	--	--	--	--	4.7	Tier II (GLI database)	330	USEPA Reg 5	4.70E+00	Tier II (GLI database)
2-Methylphenol	95-48-7	600	67	--	--	67	Tier II (GLI database)	67	USEPA Reg 5	6.70E+01	Ohio Administrative Code
3-Methylphenol	108-39-4	560	62	--	--	62	Tier II (GLI database)	62	USEPA Reg 5	6.20E+01	Ohio Administrative Code
4-Methylphenol	106-44-5	480	53	--	--	53	Tier II (GLI database)	25	USEPA Reg 5	5.30E+01	Ohio Administrative Code
Mirex	2385-85-5	--	--	0.001	NAWQC 2009	0.001	Tier II (GLI database)	--	--	1.00E-03	NAWQC 2009
Naphthalene	91-20-3	170	21	--	--	21	Tier II (GLI database)	13	USEPA Reg 5	2.10E+01	Ohio Administrative Code
Nitrilotriacetic acid	139-13-9	--	--	--	--	5000	Tier II (GLI database)	--	--	5.00E+03	Tier II (GLI database)
Nitrobenzene	99-95-3	2,000	380	--	--	380	Tier II (GLI database)	220	USEPA Reg 5	3.80E+02	Ohio Administrative Code
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 and 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
PCP	87-86-5	5.3	4	15	NAWQC 2009	--	--	4	USEPA Reg 5	4.00E+00	Ohio Administrative Code
Perchlorate	14797-73-0	20,000	10,000	--	--	--	--	--	--	1.00E+04	Ohio Administrative Code
Phenanthrene	85-01-8	31	2.3	--	--	2.3	Tier II (GLI database)	3.6	USEPA Reg 5	2.30E+00	Ohio Administrative Code
Phenol	108-95-2	4,700	400	--	--	400	Tier II (GLI database)	180	USEPA Reg 5	4.00E+02	Ohio Administrative Code
Phenol (cold water and salmon spawning habitat)	108-95-2	4,600	160	--	--	--	--	--	--	1.60E+02	Ohio Administrative Code
Phorate	298-02-2	--	--	--	--	--	--	3.62	USEPA Reg 5	3.62E+00	USEPA Reg 5
PCBs	1336-36-3	1.20E-04	1.20E-04	0.014	NAWQC 2009	--	--	1.20E-04	USEPA Reg 5	1.20E-04	Ohio Administrative Code
Propylene glycol	57-55-6	640,000	71,000	--	--	71000	Tier II (GLI database)	--	--	7.10E+04	Ohio Administrative Code
Pyrene	129-00-0	42	4.6	--	--	4.6	Tier II (GLI database)	0.3	USEPA Reg 5	4.60E+00	Ohio Administrative Code
Pyridine	110-86-1	--	--	--	--	--	--	2,380	USEPA Reg 5	2.38E+03	USEPA Reg 5

Table H-16. ESVs for Chemical Analytes in Surface Water (continued)

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio EPA Administrative Code (µg/L)[a]		Updated Values for Suter and Tsao 1996[b]				USEPA Region 5 ESLs (2003)[c] (update of 1998 EDQLs)		Preferred Surface Water Value[d]	
				NAWQC 2009 Update		Tier II Values					
		OMZM	OMZA	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
RDX	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-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	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)

Table H-16. ESVs for Chemical Analytes in Surface Water (continued)

Analyte	CAS Registry Number	Surface Water Screening Values									
		Ohio EPA Administrative Code (µg/L)[a]		Updated Values for Suter and Tsao 1996[b]				USEPA Reg 5 ESLs (2003)[c] (update of 1998 EDQLs)		Preferred Surface Water Value[d]	
				NAWQC 2009 Update		Tier II Values					
		OMZM	OMZA	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference	Number (µg/L)	Reference
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
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 PCBs and 4,4'-DDT. PCP is pH dependent; 6.5 used as default pH. Ammonia is both pH and temperature dependent; default value is the lowest available for each criterion. 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. 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 Reg 5 (USEPA 2003). For comparisons of maximum detected concentrations 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 Reg 5 (USEPA 2003) was used in the comparison.

BHC = Hexachlorocyclohexane.
CAS = Chemical Abstract Service.
DDD = Dichlorodiphenyldichloroethane.
DDE = Dichlorodiphenyldichloroethylene.
DDT = Dichlorodiphenyltrichloroethane.
Diss = Dissolved.
EDQL = Ecological data quality level.
ESL = Ecological screening level.
ESV = Ecological screening value.
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.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
µg/L = Micrograms per liter.
MBAS = Methylene Blue Active Substance
NAWQC = National Ambient Water Quality Criteria, originally found in Suter and Tsao 1996 and updated in 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.
Ohio EPA = Ohio Environmental Protection Agency.
Ohio EPA Tier II values used where available; otherwise, lowest or most recent value, as appropriate.
OMZA = Outside mixing zone average.
OMZM = Outside mixing zone maximum.
PCB = Polychlorinated biphenyl.
PCDD = Pentachlrorodibenzodiozin
PCP = Pentachlorophenol.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
Reg = Region.
TCDD = Tetrachlorodibenzo-p-dioxin.
USEPA = U.S. Environmental Protection Agency.
-- = No value.

Table H-17. SRC and Integrated COPEC Screening with Maximum Ratio for Shallow Surface Soil (0-1 ft bgs Discrete Samples) at the Upper and Lower Cobbs Ponds AOC

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Inorganic Chemicals														
Aluminum	**7429-90-5**	**24/ 24**	**6450**	**19200**	**11900**	**17700**	**No**	**Yes**	**Exceeds background**	**50**	**PRGs**	**Yes**	**Exceeds ESV**	**384**
Antimony	7440-36-0	10/ 17	0.086	0.46	0.22	0.96	No	No	Below background	0.27	EcoSSL	No	Below background	1.70
Arsenic	**7440-38-2**	**24/ 24**	**4.2**	**28.4**	**11.1**	**15.4**	**No**	**Yes**	**Exceeds background**	**18**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.58**
Barium	7440-39-3	24/ 24	35.2	90.4	61	88.4	No	Yes	Exceeds background	330	EcoSSL	No	Below ESV	0.27
Beryllium	7440-41-7	24/ 24	0.36	0.86	0.524	0.88	No	No	Below background	21	EcoSSL	No	Below background	0.04
Cadmium	**7440-43-9**	**19/ 24**	**0.053**	**0.49**	**0.135**	**0**	**No**	**Yes**	**Exceeds background**	**0.36**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.36**
Calcium	7440-70-2	24/ 24	195	4040	1310	15800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	24/ 24	9.6	24.8	15.4	17.4	No	Yes	Exceeds background	26	EcoSSL	No	Below ESV	0.95
Chromium, hexavalent	18540-29-9	1/ 1	1	1	1	0	No	Yes	Exceeds background	130	EcoSSL	No	Below ESV	0.01
Cobalt	**7440-48-4**	**24/ 24**	**4.5**	**16.4**	**8.9**	**10.4**	**No**	**Yes**	**Exceeds background**	**13**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.26**
Copper	7440-50-8	24/ 24	4.2	23.9	14.1	17.7	No	Yes	Exceeds background	28	EcoSSL	No	Below ESV	0.85
Cyanide	57-12-5	4/ 11	0.31	1.2	0.292	0	No	Yes	Exceed s background	1.33	USEPA Reg 5	No	Below ESV	0.90
Iron	7439-89-6	24/ 24	13400	44000	23000	23100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	**7439-92-1**	**24/ 24**	**10.6**	**31.3**	**18.7**	**26.1**	**No**	**Yes**	**Exceeds background**	**11**	**EcoSSL**	**Yes**	**Exceeds ESV**	**2.85**
Magnesium	7439-95-4	24/ 24	1340	4310	2560	3030	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	24/ 24	78.6	667	281	1450	No	No	Below background	220	EcoSSL	No	Below background	3.03
Mercury	**7439-97-6**	**21/ 24**	**0.021**	**0.074**	**0.043**	**0.036**	**Yes**	**Yes**	**Exceeds background PBT Compound**	**0.00051**	**PRGs**	**Yes**	**Exceeds ESV PBT Compound**	**145.10**
Nickel	7440-02-0	24/ 24	8.6	27.2	17	21.1	No	Yes	Exceeds background	38	EcoSSL	No	Below ESV	0.72
Potassium	7440-09-7	24/ 24	508	2220	1020	927	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	21/ 24	0.48	1.4	0.813	1.4	No	No	Below background	0.52	EcoSSL	No	Below background	2.69
Silver	7440-22-4	9/ 24	0.032	0.45	0.0996	0	No	Yes	Exceeds background	4.2	EcoSSL	No	Below ESV	0.11
Sodium	7440-23-5	24/ 24	38.4	159	74	123	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	14/ 24	0.11	0.25	0.173	0	No	Yes	Exceeds background	1	PRGs	No	Below ESV	0.25
Vanadium	**7440-62-2**	**24/ 24**	**14.1**	**35.3**	**20.9**	**31.1**	**No**	**Yes**	**Exceeds background**	**7.8**	**EcoSSL**	**Yes**	**Exceeds background**	**4.53**
Zinc	**7440-66-6**	**24/ 24**	**47.7**	**121**	**63.9**	**61.8**	**No**	**Yes**	**Exceeds background**	**46**	**EcoSSL**	**Yes**	**Exceeds background**	**2.63**
Anions														
Nitrate/Nitrite (NO3/NO2-N)	**14797-55-8**	**1/ 11**	**1.4**	**1.4**	**0.545**	**0**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Explosives														
Nitrocellulose	**9004-70-0**	**3/ 3**	**1.2**	**1.5**	**1.4**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds														
2-Methylnaphthalene	91-57-6	1/ 14	0.0091	0.0091	0.293	0	No	Yes	Detected organic	3.24	USEPA Reg 5	No	Below ESV	0.003
Acenaphthylene	208-96-8	1/ 14	0.012	0.012	0.0459	0	No	Yes	Detected organic	682	USEPA Reg 5	No	Below ESV	1.76E-05
Benz(a)anthracene	56-55-3	3/ 14	0.017	0.066	0.0484	0	No	Yes	Detected organic	5.21	USEPA Reg 5	No	Below ESV	0.01
Benzenemethanol	100-51-6	1/ 13	0.44	0.44	0.337	0	No	Yes	Detected organic	65.8	USEPA Reg 5	No	Below ESV	0.01
Benzo(a)pyrene	50-32-8	3/ 14	0.014	0.057	0.0482	0	No	Yes	Detected organic	1.52	USEPA Reg 5	No	Below ESV	0.04
Benzo(b)fluoranthene	205-99-2	2/ 14	0.021	0.059	0.0506	0	No	Yes	Detected organic	59.8	USEPA Reg 5	No	Below ESV	0.001
Benzo(ghi)perylene	191-24-2	1/ 14	0.031	0.031	0.0519	0	No	Yes	Detected organic	119	USEPA Reg 5	No	Below ESV	2.61E-04
Benzo(k)fluoranthene	207-08-9	1/ 14	0.028	0.028	0.0499	0	No	Yes	Detected organic	148	USEPA Reg 5	No	Below ESV	1.89E-04
Benzoic Acid	**65-85-0**	**1/ 13**	**17**	**17**	**2.05**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Bis(2-ethylhexyl)phthalate	117-81-7	1/ 14	0.23	0.23	0.304	0	No	Yes	Detected organic	0.925	USEPA Reg 5	No	Below ESV	0.25
Chrysene	218-01-9	2/ 14	0.014	0.048	0.0462	0	No	Yes	Detected organic	4.73	USEPA Reg 5	No	Below ESV	0.01
Di-n-butyl phthalate	84-74-2	2/ 14	0.021	0.027	0.27	0	No	Yes	Detected organic	200	PRGs	No	Below ESV	1.35E-04

Table H-17. SRC and Integrated COPEC Screening with Maximum Ratio for Shallow Surface Soil (0-1 ft bgs Discrete Samples) at the Upper and Lower Cobbs Ponds AOC (continued)

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Fluoranthene	206-44-0	7/ 14	0.012	0.11	0.0549	0	No	Yes	Detected organic	122	USEPA Reg 5	No	Below ESV	0.001
Indeno(1,2,3-cd)pyrene	193-39-5	1/ 14	0.026	0.026	0.0494	0	No	Yes	Detected organic	109	USEPA Reg 5	No	Below ESV	2.39E-04
Phenanthrene	85-01-8	4/ 14	0.0095	0.093	0.0506	0	No	Yes	Detected organic	45.7	USEPA Reg 5	No	Below ESV	0.002
Pyrene	129-00-0	7/ 14	0.011	0.079	0.0517	0	No	Yes	Detected organic	78.5	USEPA Reg 5	No	Below ESV	0.001
Pesticides/PCBs														
beta-BHC	**319-85-7**	**1/ 3**	**0.0035**	**0.0035**	**0.00193**	**0**	**Yes**	**Yes**	**Detected organic PBT Compound**	**0.00398**	**USEPA Reg 5**	**Yes**	**PBT Compound**	**0.88**

[a]Background criteria for soil 0-1 ft bgs are from final facility-wide background values for the Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).
[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; PCBs; 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD); dioxin; PCDF (furans); 1,2,3,4-tetrachlorobenzene; 1,2,4,5-tetrachlorobenzene; toxaphene; and other chemicals that are reasonably anticipated to bioaccumulate in animal tissues.
[c]Screening level source: See soil ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is EcoSSLs, followed by U.S. Department of Energy (1997a) *Preliminary Remediation Goals for Ecological Endpoints*, followed by USEPA Reg 5 ecological screening levels.
AOC = Area of concern.
bgs = Below ground surface.
CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
EcoSSL = Ecological soil screening level.
ESV = Ecological screening value.
Freq = Frequency.
ft = Feet.
Max = Maximum.
Min = Minimum.
mg/kg = Milligrams per kilogram.
PBT = Persistent, bioaccumulative, and toxic.
PCB = Polychlorinated biphenyl.
PRG = Preliminary remediation goal.
Reg = Region.
SRC = Site-related contaminant.
USEPA = U.S. Environmental Protection Agency
Bold = Chemical is a COPEC.

Table H-18. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment (Discrete Samples) at the Backwater Area Exposure Unit

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Inorganic Chemicals															
Aluminum	7429-90-5	14/ 14	6620	18600	12500	13900	29000	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Antimony	**7440-36-0**	**11/ 14**	**0.24**	**2.1**	**0.607**	**0**	**1.3**	**No**	**Yes**	**Exceeds SRV**	**No ESV**	**No Source**	**Yes**	**Exceeds SRV**	**No ESV**
Arsenic	7440-38-2	14/ 14	3.5	16.7	10.2	19.5	25	No	No	Below background	9.79	MacDonald et al.	No	Below background	1.71
Barium	7440-39-3	14/ 14	53.8	151	99.5	123	190	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Beryllium	**7440-41-7**	**14/ 14**	**0.34**	**1.1**	**0.782**	**0.38**	**0.8**	**No**	**Yes**	**Exceeds SRV**	**No ESV**	**No Source**	**Yes**	**Exceeds SRV**	**No ESV**
Cadmium	**7440-43-9**	**14/ 14**	**0.11**	**2.3**	**0.972**	**0**	**0.79**	**No**	**Yes**	**Exceeds SRV**	**0.99**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**2.32**
Calcium	7440-70-2	14/ 14	1180	15400	3790	5510	21000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	**7440-47-3**	**14/ 14**	**9.9**	**56.5**	**23.3**	**18.1**	**29**	**No**	**Yes**	**Exceeds SRV**	**43.4**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.30**
Cobalt	7440-48-4	14/ 14	5.4	22.8	13.6	9.1	12	No	Yes	Exceeds SRV	50	USEPA Reg 5	No	Below ESV	0.46
Copper	**7440-50-8**	**14/ 14**	**10.9**	**62.3**	**28.2**	**27.6**	**32**	**No**	**Yes**	**Exceeds SRV**	**31.6**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.97**
Cyanide	**57-12-5**	**3/ 12**	**0.1**	**0.55**	**0.224**	**0**	**--**	**No**	**Yes**	**Exceeds background**	**0.0001**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**5500**
Iron	7439-89-6	14/ 14	12700	36100	21400	28200	41000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	**7439-92-1**	**14/ 14**	**14.2**	**57.9**	**29.6**	**27.4**	**47**	**No**	**Yes**	**Exceeds SRV**	**35.8**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.62**
Magnesium	7439-95-4	14/ 14	1170	3830	2230	2760	7100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	14/ 14	179	999	520	1950	1500	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Mercury	**7439-97-6**	**13/ 14**	**0.031**	**0.11**	**0.0816**	**0.059**	**0.12**	**Yes**	**Yes**	**PBT Compound**	**0.18**	**MacDonald et al.**	**Yes**	**PBT Compound**	**0.61**
Nickel	**7440-02-0**	**14/ 14**	**9.4**	**35.5**	**20.5**	**17.7**	**33**	**No**	**Yes**	**Exceeds SRV**	**22.7**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.56**
Potassium	7440-09-7	14/ 14	541	1740	1140	1950	6800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	**7782-49-2**	**8/ 14**	**0.26**	**2.7**	**0.5**	**1.7**	**1.7**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Silver	**7440-22-4**	**13/ 14**	**0.51**	**23**	**5.7**	**0**	**0.43**	**No**	**Yes**	**Exceeds SRV**	**0.5**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**46**
Sodium	7440-23-5	14/ 14	55.2	239	140	112	--	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	1/ 14	0.16	0.16	0.196	0.89	4.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Vanadium	7440-62-2	14/ 14	11.7	30	19.9	26.1	40	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Zinc	7440-66-6	14/ 14	74.8	418	179	532	160	No	No	Below background	121	MacDonald et al.	No	Below background	3.45
Anions															
Nitrate/Nitrite (NO3/NO2-N)	**14797-55-8**	**1/ 12**	**2.2**	**2.2**	**0.804**	**0**	**--**	**No**	**Yes**	**Detected, no background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Explosives															
2,4,6-Trinitrotoluene	**118-96-7**	**6/ 14**	**0.049**	**0.32**	**0.0811**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
2,6-Dinitrotoluene	**606-20-2**	**1/ 14**	**0.16**	**0.16**	**0.0483**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.0398**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**4.02**
Nitrocellulose	**9004-70-0**	**4/ 4**	**2.5**	**10.4**	**4.75**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Tetryl	**479-45-8**	**1/ 14**	**0.024**	**0.024**	**0.0294**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds															
Anthracene	**120-12-7**	**2/ 5**	**0.074**	**0.22**	**0.0956**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.0572**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**3.85**
Benz(a)anthracene	**56-55-3**	**3/ 5**	**0.058**	**0.83**	**0.274**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.108**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**7.69**
Benzo(a)pyrene	**50-32-8**	**4/ 5**	**0.063**	**0.89**	**0.323**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.15**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**5.93**
Benzo(b)fluoranthene	205-99-2	3/ 5	0.1	0.86	0.338	0	--	No	Yes	Detected organic	10.4	USEPA Reg 5	No	Below ESV	0.08
Benzo(g,h,i)perylene	**191-24-2**	**3/ 5**	**0.05**	**0.49**	**0.22**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.17**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**2.88**
Benzo(k)fluoranthene	**207-08-9**	**3/ 5**	**0.044**	**0.8**	**0.265**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.24**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**3.33**
Bis(2-ethylhexyl)phthalate	117-81-7	1/ 5	0.16	0.16	0.165	0	--	No	Yes	Detected organic	0.182	USEPA Reg 5	No	Below ESV	0.88
Chrysene	**218-01-9**	**4/ 5**	**0.06**	**0.93**	**0.338**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.166**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**5.60**
Dibenz(a,h)anthracene	**53-70-3**	**1/ 5**	**0.066**	**0.066**	**0.095**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.033**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**2.00**
Fluoranthene	**206-44-0**	**3/ 5**	**0.11**	**1.8**	**0.61**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.423**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**4.26**
Fluorene	86-73-7	1/ 5	0.053	0.053	0.0844	0	--	No	Yes	Detected organic	0.0774	MacDonald et al.	No	Below ESV	0.68
Indeno(1,2,3-cd)pyrene	**193-39-5**	**3/ 5**	**0.04**	**0.48**	**0.192**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.2**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**2.40**
Phenanthrene	**85-01-8**	**3/ 5**	**0.034**	**0.91**	**0.285**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.204**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**4.46**
Pyrene	**129-00-0**	**3/ 5**	**0.084**	**1.9**	**0.604**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.195**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**9.74**
Pesticides/PCBs															
PCB-1254[d]	**11097-69-1**	**2/ 4**	**0.046**	**0.047**	**0.0568**	**0**	**--**	**Yes**	**Yes**	**Detected organic PBT Compound**	**0.0598**	**MacDonald et al.**	**Yes**	**PBT Compound**	**0.79**

Table H-18. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment (Discrete Samples) at the Backwater Area Exposure Unit (continued)

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Volatile Organic Compounds															
2-Butanone	**78-93-3**	**3/ 5**	**0.03**	**0.055**	**0.0256**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.0424**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**1.30**
Acetone	**67-64-1**	**5/ 5**	**0.02**	**0.19**	**0.12**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.0099**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**19.19**
Methylene Chloride	75-09-2	1/ 5	0.048	0.048	0.0145	0	--	No	Yes	Detected organic	0.159	USEPA Reg 5	No	Below ESV	0.30

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; 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]ESV: See sediment ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is MacDonald et al. "Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems," *Arch. Environ. Contam. Toxicol*. **39**: 1. January 2000; followed by USEPA Reg 5 ecological screening levels.

[d]ESV is for PCBs (total PCBs).

--= SRV not available.
CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological Screening Value.
Freg = Frequency.
Max = Maximum.
Min = Minimum.
mg/kg = Milligrams per kilogram.
PBT = Persistent, bioaccumulative, and toxic.
PCB = Polychlorinated biphenyl.
Reg = Region.
SRC = Site-related contaminant.
SRV = Sediment reference value.
USEPA = U.S. Environmental Protection Agency.
Bold = Chemical is a COPEC.

Table H-19. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment (Discrete Samples) at the Upper Cobbs Pond Exposure Unit

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Inorganic Chemicals															
Aluminum	7429-90-5	5/ 5	13400	21400	16500	13900	29000	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Antimony	**7440-36-0**	**5/ 5**	**0.21**	**1.9**	**0.78**	**0**	**1.3**	**No**	**Yes**	**Exceeds SRV**	**No ESV**	**No Source**	**Yes**	**Exceeds SRV**	**No ESV**
Arsenic	7440-38-2	5/ 5	5.1	18.8	12.3	19.5	25	No	No	Below background	9.79	MacDonald et al.	No	Below background	1.92
Barium	7440-39-3	5/ 5	58.7	157	106	123	190	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Beryllium	**7440-41-7**	**5/ 5**	**0.44**	**1.3**	**0.842**	**0.38**	**0.8**	**No**	**Yes**	**Exceeds SRV**	**No ESV**	**No Source**	**Yes**	**Exceeds SRV**	**No ESV**
Cadmium	**7440-43-9**	**3/ 5**	**0.15**	**2.3**	**0.95**	**0**	**0.79**	**No**	**Yes**	**Exceeds SRV**	**0.99**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**2.32**
Calcium	7440-70-2	5/ 5	771	5440	2780	5510	21000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	**7440-47-3**	**6/ 6**	**19.9**	**91.6**	**50.8**	**18.1**	**29**	**No**	**Yes**	**Exceeds SRV**	**43.4**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**2.11**
Chromium, hexavalent	**18540-29-9**	**1/ 5**	**10.6**	**10.6**	**2.73**	**0**	**--**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Cobalt	7440-48-4	5/ 5	5.9	19.3	13.3	9.1	12	No	Yes	Exceeds SRV	50	USEPA Reg 5	No	Below ESV	0.39
Copper	**7440-50-8**	**5/ 5**	**14.1**	**106**	**57.1**	**27.6**	**32**	**No**	**Yes**	**Exceeds SRV**	**31.6**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**3.35**
Iron	7439-89-6	5/ 5	18300	41800	30300	28200	41000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	**7439-92-1**	**5/ 5**	**13.1**	**52.4**	**27.7**	**27.4**	**47**	**No**	**Yes**	**Exceeds SRV**	**35.8**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.46**
Magnesium	7439-95-4	5/ 5	2370	3690	3150	2760	7100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	5/ 5	138	712	438	1950	1500	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Mercury	**7439-97-6**	**5/ 5**	**0.014**	**0.15**	**0.0662**	**0.059**	**0.12**	**Yes**	**Yes**	**Exceeds SRV PBT Compound**	**0.18**	**MacDonald et al.**	**Yes**	**PBT Compound**	**0.83**
Nickel	**7440-02-0**	**5/ 5**	**13.1**	**41.1**	**28.7**	**17.7**	**33**	**No**	**Yes**	**Exceeds SRV**	**22.7**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.81**
Potassium	7440-09-7	5/ 5	1060	2100	1730	1950	6800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	**7782-49-2**	**3/ 5**	**0.22**	**2.9**	**0.839**	**1.7**	**1.7**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Silver	**7440-22-4**	**3/ 5**	**0.55**	**11**	**3.81**	**0**	**0.43**	**No**	**Yes**	**Exceeds SRV**	**0.5**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**22.00**
Sodium	7440-23-5	5/ 5	82.7	340	156	112	--	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	2/ 5	0.24	0.37	0.237	0.89	4.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Vanadium	7440-62-2	5/ 5	23.3	33.4	27.8	26.1	40	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Zinc	7440-66-6	5/ 5	71.3	479	240	532	160	No	No	Below background	121	MacDonald et al.	No	Below background	3.96
Explosives															
1,3-Dinitrobenzene	**99-65-0**	**1/ 5**	**0.036**	**0.036**	**0.0144**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.00861**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**4.18**
2,4,6-Trinitrotoluene	**118-96-7**	**2/ 5**	**0.087**	**0.15**	**0.0575**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
4-Amino-2,6-Dinitrotoluene	**19406-51-0**	**1/ 1**	**0.12**	**0.12**	**0.12**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
HMX	**2691-41-0**	**1/ 5**	**0.083**	**0.083**	**0.0606**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Nitrocellulose	**9004-70-0**	**2/ 2**	**2**	**5.7**	**3.85**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Tetryl	**479-45-8**	**1/ 5**	**0.019**	**0.019**	**0.021**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds															
Benz(a)anthracene	56-55-3	1/ 2	0.078	0.078	0.0615	0	--	No	Yes	Detected organic	0.108	MacDonald et al.	No	Below ESV	0.72
Benzo(a)pyrene	50-32-8	1/ 2	0.12	0.12	0.0845	0	--	No	Yes	Detected organic	0.15	MacDonald et al.	No	Below ESV	0.80
Benzo(b)fluoranthene	205-99-2	1/ 2	0.19	0.19	0.14	0	--	No	Yes	Detected organic	10.4	USEPA Reg 5	No	Below ESV	0.02
Benzo(g,h,i)perylene	191-24-2	1/ 2	0.11	0.11	0.12	0	--	No	Yes	Detected organic	0.17	USEPA Reg 5	No	Below ESV	0.65
Benzo(k)fluoranthene	207-08-9	1/ 2	0.067	0.067	0.081	0	--	No	Yes	Detected organic	0.24	USEPA Reg 5	No	Below ESV	0.28
Chrysene	218-01-9	1/ 2	0.11	0.11	0.072	0	--	No	Yes	Detected organic	0.166	MacDonald et al.	No	Below ESV	0.66
Fluoranthene	206-44-0	1/ 2	0.22	0.22	0.15	0	--	No	Yes	Detected organic	0.423	MacDonald et al.	No	Below ESV	0.52
Indeno(1,2,3-cd)pyrene	193-39-5	1/ 2	0.09	0.09	0.0925	0	--	No	Yes	Detected organic	0.2	USEPA Reg 5	No	Below ESV	0.45
Phenanthrene	85-01-8	1/ 2	0.07	0.07	0.065	0	--	No	Yes	Detected organic	0.204	MacDonald et al.	No	Below ESV	0.34
Pyrene	129-00-0	1/ 2	0.18	0.18	0.15	0	--	No	Yes	Detected organic	0.195	MacDonald et al.	No	Below ESV	0.92

Table H-19. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment (Discrete Samples) at the Upper Cobbs Pond Exposure Unit (continued)

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Pesticides/PCBs															
PCB-1254[d]	**11097-69-1**	**1/ 2**	**0.032**	**0.032**	**0.0685**	**0**	**--**	**Yes**	**Yes**	**Detected organic PBT Compound**	**0.0598**	**MacDonald et al.**	**Yes**	**PBT Compound**	**0.54**
Volatile Organic Compounds															
2-Butanone	78-93-3	2/ 2	0.022	0.033	0.0275	0	--	No	Yes	Detected organic	0.0424	USEPA Reg 5	No	Below ESV	0.78
Acetone	**67-64-1**	**2/ 2**	**0.088**	**0.091**	**0.0895**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.0099**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**9.19**

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; 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]ESV: See sediment ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is MacDonald et al. "Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems," *Arch. Environ. Contam. Toxicol*. **39**:1. January 2000; followed by USEPA Reg 5 ecological screening levels.

[d]ESV is for PCBs (total PCBs).

-- = SRV not available.
CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
Max = Maximum.
mg/kg = Milligrams per kilogram.
Min = Minimum.
PBT = Persistent, bioaccumulative, and toxic.
PCB = Polychlorinated biphenyl.
Reg = Region.
SRC = Site-related contaminant.
SRV = Sediment reference value.
USEPA = U.S. Environmental Protection Agency.
Bold = Chemical is a COPEC.

Table H-20. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment (ISM Sample) at the Upper Cobbs Pond Exposure Unit

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC?	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV[d]
Inorganic Chemicals															
Aluminum	7429905	1/ 1	9030	9030	9030	13900	29000	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Antimony	7440360	1/ 1	1	1	1	0	1.3	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Arsenic	7440382	1/ 1	6.5	6.5	6.5	19.5	25	No	No	Below background	9.79	MacDonald et al.	No	Below background	0.66
Barium	7440393	1/ 1	78.9	78.9	78.9	123	190	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Beryllium	7440417	1/ 1	0.48	0.48	0.48	0.38	0.8	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Cadmium	7440439	1/ 1	0.6	0.6	0.6	0	0.79	No	No	Below SRV	0.99	MacDonald et al.	No	Below SRV	0.61
Calcium	7440702	1/ 1	1960	1960	1960	5510	21000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440473	1/ 1	18.6	18.6	18.6	18.1	29	No	No	Below SRV	43.4	MacDonald et al.	No	Below SRV	0.43
Cobalt	7440484	1/ 1	7.7	7.7	7.7	9.1	12	No	No	Below background	50	USEPA Reg 5	No	Below background	0.15
Iron	7439896	1/ 1	16200	16200	16200	28200	41000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	7439921	1/ 1	17.8	17.8	17.8	27.4	47	No	No	Below background	35.8	MacDonald et al.	No	Below background	0.50
Magnesium	7439954	1/ 1	1530	1530	1530	2760	7100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439965	1/ 1	383	383	383	1950	1500	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Mercury	**7439976**	**1/ 1**	**0.048**	**0.048**	**0.048**	**0.059**	**0.12**	**Yes**	**Yes**	**PBT Compound**	**0.18**	**MacDonald et al.**	**Yes**	**PBT Compound**	**0.27**
Nickel	7440020	1/ 1	14.4	14.4	14.4	17.7	33	No	No	Below background	22.7	MacDonald et al.	No	Below background	0.63
Potassium	7440097	1/ 1	858	858	858	1950	6800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782492	1/ 1	1.1	1.1	1.1	1.7	1.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Silver	**7440224**	**1/ 1**	**1.1**	**1.1**	**1.1**	**0**	**0.43**	**No**	**Yes**	**Exceeds SRV**	**0.5**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**2.20**
Sodium	7440235	1/ 1	106	106	106	112	--	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Vanadium	7440622	1/ 1	15.6	15.6	15.6	26.1	40	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Zinc	7440666	1/ 1	153	153	153	532	160	No	No	Below background	121	MacDonald et al.	No	Below background	1.26
Anions															
Nitrate/Nitrite (NO3/NO2-N)	**14797558**	**1/ 1**	**5.3**	**5.3**	**5.3**	**0**	**--**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Miscellaneous															
Ammonia	**7664417**	**1/ 1**	**69**	**69**	**69**	**0**	**--**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Total Phosphorus as P	**7723140**	**1/ 1**	**270**	**270**	**270**	**0**	**--**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Semi-volatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	**117817**	**1/ 1**	**0.84**	**0.84**	**0.84**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.182**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**4.62**
Butyl benzyl phthalate	85687	1/ 1	0.16	0.16	0.16	0	--	No	Yes	Detected organic	1.97	USEPA Reg 5	No	Below ESV	0.08
Di-n-butyl phthalate	**84742**	**1/ 1**	**2.7**	**2.7**	**2.7**	**0**	**--**	**No**	**Yes**	**Detected organic**	**1.114**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**2.42**

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 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]ESV: See sediment ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is MacDonald et al. "Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems," *Arch. Environ. Contam. Toxicol.* **39**:1. January 2000; followed by USEPA Reg 5 ecological screening levels.

[d] Because there is only one ISM sediment sample at Upper Cobbs Pond, max and average concentrations are equal, and this ratio represents comparison of the ESV to both the average and the max concentrations.

-- = SRV not available.
CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
ISM = Incremental sampling methodology.
Max = Maximum.
mg/kg = Milligrams per kilogram.
Min = Minimum.
PBT = Persistent, bioaccumulative, and toxic.
Reg = Region.
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 Maximum Ratio for Sediment (Discrete Samples) at the Lower Cobbs Pond Exposure Unit

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Inorganic Chemicals															
Aluminum	7429-90-5	8/ 8	8920	16400	12800	13900	29000	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Antimony	**7440-36-0**	**1/ 8**	**1.4**	**1.4**	**0.328**	**0**	**1.3**	**No**	**Yes**	**Exceeds SRV**	**No ESV**	**No Source**	**Yes**	**Exceeds SRV**	**No ESV**
Arsenic	**7440-38-2**	**8/ 8**	**5.1**	**34.3**	**14.9**	**19.5**	**25**	**No**	**Yes**	**Exceeds SRV**	**9.79**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**3.50**
Barium	7440-39-3	8/ 8	51.3	149	84.8	123	190	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Beryllium	**7440-41-7**	**8/ 8**	**0.42**	**0.93**	**0.679**	**0.38**	**0.8**	**No**	**Yes**	**Exceeds SRV**	**No ESV**	**No Source**	**Yes**	**Exceeds SRV**	**No ESV**
Cadmium	**7440-43-9**	**6/ 8**	**0.1**	**1.5**	**0.536**	**0**	**0.79**	**No**	**Yes**	**Exceeds SRV**	**0.99**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.52**
Calcium	7440-70-2	8/ 8	699	7360	2670	5510	21000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	**7440-47-3**	**8/ 8**	**11.9**	**150**	**59**	**18.1**	**29**	**No**	**Yes**	**Exceeds SRV**	**43.4**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**3.46**
Chromium, hexavalent	**18540-29-9**	**2/ 6**	**5**	**5.7**	**2.12**	**--**	**--**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Cobalt	7440-48-4	8/ 8	8.6	21.3	12	9.1	12	No	Yes	Exceeds SRV	50	USEPA Reg 5	No	Below ESV	0.43
Copper	**7440-50-8**	**8/ 8**	**12.4**	**149**	**56.6**	**27.6**	**32**	**No**	**Yes**	**Exceeds SRV**	**31.6**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**4.72**
Cyanide	**57-12-5**	**1/ 6**	**0.4**	**0.4**	**0.225**	**0**	**--**	**No**	**Yes**	**Exceeds background**	**0.0001**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**4000**
Iron	7439-89-6	8/ 8	15800	32200	23800	28200	41000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	**7439-92-1**	**8/ 8**	**12.3**	**60.4**	**29.4**	**27.4**	**47**	**No**	**Yes**	**Exceeds SRV**	**35.8**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.69**
Magnesium	7439-95-4	8/ 8	2140	3240	2610	2760	7100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	8/ 8	217	966	502	1950	1500	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Mercury	**7439-97-6**	**7/ 8**	**0.016**	**0.093**	**0.0538**	**0.059**	**0.12**	**Yes**	**Yes**	**PBT Compound**	**0.18**	**MacDonald et al.**	**Yes**	**PBT Compound**	**0.52**
Nickel	7440-02-0	8/ 8	15.3	30.2	20.4	17.7	33	No	No	Below SRV	22.7	MacDonald et al.	No	Below SRV	1.33
Potassium	7440-09-7	8/ 8	673	1860	1390	1950	6800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	**7782-49-2**	**4/ 8**	**0.45**	**2.2**	**0.72**	**1.7**	**1.7**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Silver	**7440-22-4**	**5/ 8**	**0.052**	**2.4**	**0.852**	**0**	**0.43**	**No**	**Yes**	**Exceeds SRV**	**0.5**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**4.80**
Sodium	7440-23-5	8/ 8	47.3	190	119	112	--	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	2/ 8	0.13	0.41	0.179	0.89	4.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Vanadium	7440-62-2	8/ 8	15.3	32.2	22.5	26.1	40	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Zinc	7440-66-6	8/ 8	44.6	275	141	532	160	No	No	Below background	121	MacDonald et al.	No	Below background	2.27
Explosives															
HMX	**2691-41-0**	**1/ 8**	**0.017**	**0.017**	**0.0596**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Nitrocellulose	**9004-70-0**	**1/ 1**	**7.8**	**7.8**	**7.8**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Tetryl	**479-45-8**	**1/ 8**	**0.022**	**0.022**	**0.0344**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds															
Benz(a)anthracene	56-55-3	2/ 3	0.021	0.045	0.0437	0	--	No	Yes	Detected organic	0.108	MacDonald et al.	No	Below ESV	0.42
Benzo(a)pyrene	50-32-8	2/ 3	0.02	0.052	0.0473	0	--	No	Yes	Detected organic	0.15	MacDonald et al.	No	Below ESV	0.35
Benzo(b)fluoranthene	205-99-2	2/ 3	0.038	0.075	0.081	0	--	No	Yes	Detected organic	10.4	USEPA Reg 5	No	Below ESV	0.01
Benzo(g,h,i)perylene	191-24-2	2/ 3	0.014	0.045	0.0813	0	--	No	Yes	Detected organic	0.17	USEPA Reg 5	No	Below ESV	0.26
Benzo(k)fluoranthene	207-08-9	1/ 3	0.013	0.013	0.0993	0	--	No	Yes	Detected organic	0.24	USEPA Reg 5	No	Below ESV	0.05
Chrysene	218-01-9	2/ 3	0.027	0.052	0.0423	0	--	No	Yes	Detected organic	0.166	MacDonald et al.	No	Below ESV	0.31
Di-n-butyl phthalate	84-74-2	1/ 3	0.022	0.022	0.352	0	--	No	Yes	Detected organic	1.114	USEPA Reg 5	No	Below ESV	0.02
Fluoranthene	206-44-0	2/ 3	0.042	0.095	0.084	0	--	No	Yes	Detected organic	0.423	MacDonald et al.	No	Below ESV	0.22
Indeno(1,2,3-cd)pyrene	193-39-5	2/ 3	0.014	0.042	0.0637	0	--	No	Yes	Detected organic	0.2	USEPA Reg 5	No	Below ESV	0.21
Phenanthrene	85-01-8	1/ 3	0.014	0.014	0.0813	0	--	No	Yes	Detected organic	0.204	MacDonald et al.	No	Below ESV	0.07
Pyrene	129-00-0	2/ 3	0.032	0.083	0.095	0	--	No	Yes	Detected organic	0.195	MacDonald et al.	No	Below ESV	0.43

Table H-21. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment (Discrete Samples) at the Lower Cobbs Pond Exposure Unit (continued)

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Volatile Organic Compounds															
2-Butanone	**78-93-3**	**2/ 2**	**0.025**	**0.047**	**0.036**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.0424**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**1.11**
Acetone	**67-64-1**	**2/ 2**	**0.076**	**0.17**	**0.123**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.0099**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**17.17**
Carbon Disulfide	75-15-0	1/ 2	0.0033	0.0033	0.0029	0	--	No	Yes	Detected organic	0.0239	USEPA Reg 5	No	Below ESV	0.14

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 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]ESV: See sediment ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is MacDonald et al. "Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems," *Arch. Environ. Contam. Toxicol.* Volume **39**:1. January 2000; followed by USEPA Reg 5 ecological screening levels.

-- = SRV not available.
CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
Max = Maximum
mg/kg = Milligrams per kilogram.
Min = Minimum
PBT = Persistent, bioaccumulative, and toxic.
Reg = Region.
SRC = Site-related contaminant.
SRV = Sediment reference value.
USEPA = U.S. Environmental Protection Agency.
Bold = Chemical is a COPEC.

Table H-22. SRC and Integrated COPEC Screening with Maximum Ratio for Sediment (ISM Sample) at the Lower Cobbs Pond Exposure Unit

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC?	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV[d]
Inorganic Chemicals															
Aluminum	7429905	1/ 1	15400	15400	15400	13900	29000	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Antimony	7440360	1/ 1	1.3	1.3	1.3	0	1.3	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Arsenic	7440382	1/ 1	10.2	10.2	10.2	19.5	25	No	No	Below background	9.79	MacDonald et al.	No	Below background	1.04
Barium	7440393	1/ 1	116	116	116	123	190	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Beryllium	**7440417**	**1/ 1**	**0.83**	**0.83**	**0.83**	**0.38**	**0.8**	**No**	**Yes**	**Exceeds SRV**	**No ESV**	**No Source**	**Yes**	**Exceeds SRV and no ESV**	**No ESV**
Cadmium	**7440439**	**1/ 1**	**1.2**	**1.2**	**1.2**	**0**	**0.79**	**No**	**Yes**	**Exceeds SRV**	**0.99**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.21**
Calcium	7440702	1/ 1	2550	2550	2550	5510	21000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	**7440473**	**1/ 1**	**121**	**121**	**121**	**18.1**	**29**	**No**	**Yes**	**Exceeds background**	**43.4**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**2.79**
Cobalt	7440484	1/ 1	12	12	12	9.1	12	No	No	Below SRV	50	USEPA Reg 5	No	Below SRV	0.24
Lead	7439921	1/ 1	34.2	34.2	34.2	27.4	47	No	No	Below SRV	35.8	MacDonald et al.	No	Below SRV	0.96
Magnesium	7439954	1/ 1	2600	2600	2600	2760	7100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439965	1/ 1	602	602	602	1950	1500	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Mercury	**7439976**	**1/ 1**	**0.1**	**0.1**	**0.1**	**0.059**	**0.12**	**Yes**	**Yes**	**PBT Compound**	**0.18**	**MacDonald et al.**	**Yes**	**PBT Compound**	**0.56**
Nickel	7440020	1/ 1	24.6	24.6	24.6	17.7	33	No	No	Below SRV	22.7	MacDonald et al.	No	Below SRV	1.08
Potassium	7440097	1/ 1	1640	1640	1640	1950	6800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782492	1/ 1	1.6	1.6	1.6	1.7	1.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Silver	**7440224**	**1/ 1**	**1.5**	**1.5**	**1.5**	**0**	**0.43**	**No**	**Yes**	**Exceeds SRV**	**0.5**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**3.00**
Sodium	7440235	1/ 1	203	203	203	112	--	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Vanadium	7440622	1/ 1	24.5	24.5	24.5	26.1	40	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Zinc	7440666	1/ 1	259	259	259	532	160	No	No	Below background	121	MacDonald et al.	No	Below background	2.14
Anions															
Nitrate/Nitrite (NO3/NO2-N)	**14797558**	**1/ 1**	**8.5**	**8.5**	**8.5**	**0**	**--**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Miscellaneous															
Ammonia	**7664417**	**1/ 1**	**61**	**61**	**61**	**0**	**--**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Total Phosphorus as P	**7723140**	**1/ 1**	**360**	**360**	**360**	**0**	**--**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Semi-volatile Organic Compounds															
Di-n-butyl phthalate	84742	1/ 1	1.04	1.04	1.04	0	--	No	Yes	Detected organic	1.114	USEPA Reg 5	No	Below ESV	0.93

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated bihpenyls; 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]ESV: See sediment ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is MacDonald et al. "Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems," *Arch. Environ. Contam. Toxicol*. **39**:1. January 2000; followed by USEPA Reg 5 ecological screening levels.

[d]Because there is only one ISM sediment sample at Lower Cobbs Pond, max and average concentrations are equal, and this ratio represents comparison of the ESV to both the average and the max concentrations.

-- = SRV not available.
CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
ISM = Incremental sampling methodology.
Max = Maximum.
Min = Minimum.
PBT = Persistent, bioaccumulative, and toxic.
Reg = Region.
SRC = Site-related contaminant.
SRV = Sediment reference value.
USEPA = U.S. Environmental Protection Agency.
Bold = Chemical is a COPEC.

Table H-23. SRC and Integrated COPEC Screening with Maximum to OMZM Ratio for Surface Water at the Backwater Area Exposure Unit

Analyte (mg/L)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Inorganic Chemicals														
Aluminum	7429-90-5	4/ 4	0.26	2.52	1.15	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	28.97
Antimony	7440-36-0	2/ 4	0.00096	0.001	0.00119	0	No	Yes	Exceeds background	0.9	Ohio Administrative Code	No	Below ESV	0.001
Arsenic	7440-38-2	4/ 4	0.0009	0.0104	0.00415	0.0032	No	Yes	Exceeds background	0.34	Ohio Administrative Code	No	Below ESV	0.03
Barium	7440-39-3	4/ 4	0.0198	0.382	0.141	0.0475	No	Yes	Exceeds background	2	Ohio Administrative Code	No	Below ESV	0.19
Beryllium	7440-41-7	2/ 4	0.000053	0.000064	0.000102	0	No	Yes	Exceeds background	0.093	Ohio Administrative Code[d]	No	Below ESV	0.001
Cadmium	7440-43-9	2/ 4	0.000057	0.000062	0.00011	0	No	Yes	Exceeds background	0.0045	Ohio Administrative Code[d]	No	Below ESV	0.01
Calcium	7440-70-2	4/ 4	21.6	67.7	37.4	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	4/ 4	0.00056	0.0067	0.00297	0	No	Yes	Exceeds background	1.8	Ohio Administrative Code[d]	No	Below ESV	0.004
Cobalt	7440-48-4	4/ 4	0.00039	0.0107	0.00423	0	No	Yes	Exceeds background	0.22	Ohio Administrative Code	No	Below ESV	0.05
Copper	7440-50-8	3/ 4	0.0019	0.0088	0.00355	0.0079	No	Yes	Exceeds background	0.014	Ohio Administrative Code[d]	No	Below ESV	0.63
Iron	7439-89-6	4/ 4	0.846	16.3	7.64	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	16.30
Lead	7439-92-1	2/ 4	0.00032	0.00047	0.000698	0	No	Yes	Exceeds background	0.12	Ohio Administrative Code[d]	No	Below ESV	0.004
Magnesium	7439-95-4	4/ 4	3.25	11.2	6.1	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**4/ 4**	**0.132**	**15.8**	**6.16**	**0.391**	**No**	**Yes**	**Exceeds background**	**0.12**	**Tier II (Suter & Tsao 1996)**	**Yes**	**Exceeds ESV**	**131.67**
Nickel	7440-02-0	4/ 4	0.0019	0.0067	0.0037	0	No	Yes	Exceeds background	0.47	Ohio Administrative Code[d]	No	Below ESV	0.01
Potassium	7440-09-7	4/ 4	1.39	15.7	6.1	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	**7782-49-2**	**3/ 4**	**0.00023**	**0.0104**	**0.00335**	**0**	**No**	**Yes**	**Exceeds background**	**0.005**	**NAWQC 2009**	**Yes**	**Exceeds ESV**	**2.08**
Silver	**7440-22-4**	**1/ 4**	**0.0017**	**0.0017**	**0.000603**	**0**	**No**	**Yes**	**Exceeds background**	**0.0016**	**Ohio Administrative Code[d]**	**Yes**	**Exceeds ESV**	**1.06**
Sodium	7440-23-5	4/ 4	1.6	12.9	5.93	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	1/ 4	0.00046	0.00046	0.000865	0	No	Yes	Exceeds background	0.079	Ohio Administrative Code	No	Below ESV	0.01
Vanadium	7440-62-2	3/ 4	0.00051	0.005	0.00385	0	No	Yes	Exceeds background	0.15	Ohio Administrative Code	No	Below ESV	0.03
Zinc	7440-66-6	4/ 4	0.0101	0.109	0.0403	0.042	No	Yes	Exceeds background	0.12	Ohio Administrative Code	No	Below ESV	0.91
Anions														
Sulfate	**14808-79-8**	**1/ 2**	**29**	**29**	**15.1**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfide[e]	**18496-25-8**	**1/ 2**	**2.3**	**2.3**	**1.28**	**0**	**No**	**Yes**	**Detected no background**	**0.002**	**NAWQC 2009**	**Yes**	**Exceeds ESV**	**1150**
Explosives														
4-Amino-2,6-Dinitrotoluene	19406-51-0	2/ 2	0.000043	0.00007	0.0000565	0	No	Yes	Detected organic	0.098	Ohio Administrative Code	No	Below ESV	0.001
Volatile Organic Compounds														
Acetone	67-64-1	1/ 3	0.003	0.003	0.00433	0	No	Yes	Detected organic	1.5	Tier II (Suter & Tsao 1996)	No	Below ESV	0.002
Chloromethane	**74-87-3**	**1/ 3**	**0.0007**	**0.0007**	**0.000567**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Toluene	108-88-3	1/ 3	0.001	0.001	0.000667	0	No	Yes	Detected organic	0.56	Ohio Administrative Code	No	Below ESV	0.002

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 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 EPA Risk Assessment Guidance and letter from Ohio EPA is Ohio EPA OMZM, followed by NAWQC or Tier II values, followed by U.S. Environmental Protection Agency Region 5 ecological screening levels.

[d]Value is hardness dependent.

[e]In the source document, sulfide is listed under "sulfide-hydrogen sulfide," and the CAS number in the ESV table is, therefore, the one for hydrogen sulfide. Thus, the CAS numbers for sulfide and (hydrogen) sulfide listed in the ESV table do not match.

CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
Max = Maximum.
mg/L = Milligrams per liter.
Min = Minimum.
NAWQC = National Ambient Water Quality Criteria.
OMZM = Outside Mixing Zone Maximum.
PBT = Persistent, bioaccumulative, and toxic.
SRC = Site-related contaminant.
Bold = Chemical is a COPEC.

Table H-24. SRC and Integrated COPEC Screening with Maximum to OMZA Ratio for Surface Water at the Backwater Area Exposure Unit

Analyte (mg/L)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Inorganic Chemicals														
Aluminum	7429-90-5	4/ 4	0.26	2.52	1.15	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	28.97
Antimony	7440-36-0	2/ 4	0.00096	0.001	0.00119	0	No	Yes	Exceeds background	0.19	Ohio Administrative Code	No	Below ESV	0.005
Arsenic	7440-38-2	4/ 4	0.0009	0.0104	0.00415	0.0032	No	Yes	Exceeds background	0.15	Ohio Administrative Code	No	Below ESV	0.069
Barium	**7440-39-3**	**4/ 4**	**0.0198**	**0.382**	**0.141**	**0.0475**	**No**	**Yes**	**Exceeds background**	**0.22**	**Ohio Administrative Code**	**Yes**	**Exceeds ESV**	**1.74**
Beryllium	7440-41-7	2/ 4	0.000053	0.000064	0.000102	0	No	Yes	Exceeds background	0.011	Ohio Administrative Code[d]	No	Below ESV	0.006
Cadmium	7440-43-9	2/ 4	0.000057	0.000062	0.00011	0	No	Yes	Exceeds background	0.0025	Ohio Administrative Code[d]	No	Below ESV	0.025
Calcium	7440-70-2	4/ 4	21.6	67.7	37.4	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	4/ 4	0.00056	0.0067	0.00297	0	No	Yes	Exceeds background	0.086	Ohio Administrative Code[d]	No	Below ESV	0.078
Cobalt	7440-48-4	4/ 4	0.00039	0.0107	0.00423	0	No	Yes	Exceeds background	0.024	Ohio Administrative Code	No	Below ESV	0.45
Copper	7440-50-8	3/ 4	0.0019	0.0088	0.00355	0.0079	No	Yes	Exceeds background	0.0093	Ohio Administrative Code[d]	No	Below ESV	0.95
Iron	7439-89-6	4/ 4	0.846	16.3	7.64	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	16.3
Lead	7439-92-1	2/ 4	0.00032	0.00047	0.000698	0	No	Yes	Exceeds background	0.0064	Ohio Administrative Code[d]	No	Below ESV	0.073
Magnesium	7439-95-4	4/ 4	3.25	11.2	6.1	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**4/ 4**	**0.132**	**15.8**	**6.16**	**0.391**	**No**	**Yes**	**Exceeds background**	**0.12**	**Tier II (Suter & Tsao 1996)**	**Yes**	**Exceeds ESV**	**131.7**
Nickel	7440-02-0	4/ 4	0.0019	0.0067	0.0037	0	No	Yes	Exceeds background	0.052	Ohio Administrative Code[d]	No	Below ESV	0.13
Potassium	7440-09-7	4/ 4	1.39	15.7	6.1	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	**7782-49-2**	**3/ 4**	**0.00023**	**0.0104**	**0.00335**	**0**	**No**	**Yes**	**Exceeds background**	**0.005**	**Ohio Administrative Code**	**Yes**	**Exceeds ESV**	**2.08**
Silver	**7440-22-4**	**1/ 4**	**0.0017**	**0.0017**	**0.000603**	**0**	**No**	**Yes**	**Exceeds background**	**0.0013**	**Ohio Administrative Code[d]**	**Yes**	**Exceeds ESV**	**1.31**
Sodium	7440-23-5	4/ 4	1.6	12.9	5.93	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	1/ 4	0.00046	0.00046	0.000865	0	No	Yes	Exceeds background	0.017	Ohio Administrative Code	No	Below ESV	0.027
Vanadium	7440-62-2	3/ 4	0.00051	0.005	0.00385	0	No	Yes	Exceeds background	0.044	Ohio Administrative Code	No	Below ESV	0.11
Zinc	7440-66-6	4/ 4	0.0101	0.109	0.0403	0.042	No	Yes	Exceeds background	0.12	Ohio Administrative Code	No	Below ESV	0.91
Anions														
Sulfate	**14808-79-8**	**1/ 2**	**29**	**29**	**15.1**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfide[e]	**18496-25-8**	**1/ 2**	**2.3**	**2.3**	**1.28**	**0**	**No**	**Yes**	**Detected no background**	**0.002**	**NAWQC 2009**	**Yes**	**Exceeds ESV**	**1150**
Explosives														
4-Amino-2,6-Dinitrotoluene	19406-51-0	2/ 2	0.000043	0.00007	0.0000565	0	No	Yes	Detected organic	0.011	Ohio Administrative Code	No	Below ESV	0.006
Volatile Organic Compounds														
Acetone	67-64-1	1/ 3	0.003	0.003	0.00433	0	No	Yes	Detected organic	1.5	Tier II (Suter & Tsao 1996)	No	Below ESV	0.002
Chloromethane	**74-87-3**	**1/ 3**	**0.0007**	**0.0007**	**0.000567**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Toluene	108-88-3	1/ 3	0.001	0.001	0.000667	0	No	Yes	Detected organic	0.062	Ohio Administrative Code	No	Below ESV	0.016

[a]Background criteria for surface water are from final facility-wide background values for the Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).
[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 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 EPA Risk Assessment Guidance and letter from Ohio EPA is Ohio EPA OMZA, followed by NAWQC or Tier II values, followed by U.S. Environmental Protection Agency Region 5 ecological screening levels.
[d]Value is hardness dependent.
[e]In the source document, sulfide is listed under "sulfide-hydrogen sulfide," and the CAS number in the ESV table is, therefore, the one for hydrogen sulfide. Thus, the CAS numbers for sulfide and (hydrogen) sulfide listed in the ESV table do not match.

CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
Max = Maximum.
mg/L = Milligrams per liter.
Min = Minimum
NAWQC = National Ambient Water Quality Criteria.
OMZA = Outside mixing zone average.
PBT = Persistent, bioaccumulative, and toxic.
SRC = Site-related contaminant.
Bold = Chemical is a COPEC.

Table H-25. SRC and Integrated COPEC Screening with Maximum to OMZM Ratio for Surface Water at the Upper Cobbs Pond Exposure Unit

Analyte (mg/L)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Inorganic Chemicals														
Aluminum	7429-90-5	5/ 5	0.0916	0.332	0.185	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	3.82
Antimony	7440-36-0	1/ 5	0.00094	0.00094	0.00215	0	No	Yes	Exceeds background	0.9	Ohio Administrative Code	No	Below ESV	0.001
Arsenic	7440-38-2	2/ 5	0.00078	0.0025	0.00464	0.0032	No	No	Below background	0.34	Ohio Administrative Code	No	Below background	0.01
Barium	7440-39-3	5/ 5	0.0138	0.0226	0.0168	0.0475	No	No	Below background	2	Ohio Administrative Code	No	Below background	0.01
Calcium	7440-70-2	5/ 5	13.2	24.3	19.6	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	2/ 5	0.00059	0.001	0.00108	0	No	Yes	Exceeds background	1.8	Ohio Administrative Code[d]	No	Below ESV	0.001
Copper	7440-50-8	3/ 5	0.0019	0.0051	0.00248	0.0079	No	No	Below background	0.014	Ohio Administrative Code[d]	No	Below background	0.36
Iron	7439-89-6	5/ 5	0.419	1.3	0.918	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	1.30
Lead	7439-92-1	3/ 5	0.00039	0.0033	0.00158	0	No	Yes	Exceeds background	0.12	Ohio Administrative Code[d]	No	Below ESV	0.028
Magnesium	7439-95-4	5/ 5	1.75	4.41	3.36	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**5/ 5**	**0.0772**	**0.528**	**0.216**	**0.391**	**No**	**Yes**	**Exceeds background**	**0.12**	**Tier II (Suter & Tsao 1996)**	**Yes**	**Exceeds ESV**	**4.4**
Nickel	7440-02-0	1/ 5	0.0019	0.0019	0.00178	0	No	Yes	Exceeds background	0.47	Ohio Administrative Code[d]	No	Below ESV	0.004
Potassium	7440-09-7	5/ 5	0.894	1.57	1.26	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	1/ 5	0.00024	0.00024	0.00243	0	No	Yes	Exceeds background	0.005	NAWQC 2009	No	Below ESV	0.05
Sodium	7440-23-5	5/ 5	1.41	3.68	2.42	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Vanadium	7440-62-2	1/ 5	0.00089	0.00089	0.00104	0	No	Yes	Exceeds background	0.15	Ohio Administrative Code	No	Below ESV	0.01
Zinc	7440-66-6	4/ 5	0.0041	0.0115	0.00984	0.042	No	No	Below background	0.12	Ohio Administrative Code	No	Below background	0.10
Anions														
Nitrate/Nitrite (NO3/NO2-N)	**N599**	**2/ 4**	**0.1**	**0.18**	**0.087**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfate	**14808-79-8**	**2/ 2**	**13**	**13**	**13**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfide[e]	**18496-25-8**	**2/ 2**	**0.7**	**0.7**	**0.7**	**0**	**No**	**Yes**	**Detected no background**	**0.002**	**NAWQC 2009**	**Yes**	**Exceeds ESV**	**350**
Miscellaneous														
Total Phosphorus as P	7723-14-0	2/ 2	0.06	0.24	0.15	0	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Explosives														
4-Amino-2,6-Dinitrotoluene	19406-51-0	2/ 3	0.000072	0.00024	0.000147	0	No	Yes	Detected organic	0.098	Ohio Administrative Code	No	Below ESV	0.002
Semi-volatile Organic Compound														
Bis(2-ethylhexyl)phthalate	117-81-7	2/ 3	0.0019	0.002	0.00313	0	No	Yes	Detected organic	1.1	Ohio Administrative Code	No	Below ESV	0.002
Di-n-butyl phthalate	84-74-2	2/ 3	0.0018	0.0046	0.0038	0	No	Yes	Detected organic	0.019	Tier II (GLI database)	No	Below ESV	0.24

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 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 EPA Risk Assessment Guidance and letter from Ohio EPA is Ohio EPA OMZM, followed by NAWQC or Tier II values, followed by U.S. Environmental Proteciton Agency Region 5 ecological screening levels.

[d]Value is hardness dependent.

[e]In the source document, sulfide is listed under "sulfide-hydrogen sulfide," and the CAS number in the ESV table is, therefore, the one for hydrogen sulfide. Thus, the CAS numbers for sulfide and (hydrogen) sulfide listed in the ESV table do not match.

CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency/
Max = Maximum
mg/L = Milligrams per liter.
Min = Minimum.
NAWQC = National Ambient Water Quality Criteria.
OMZM = Outside mixing zone maximum.
PBT = Persistent, bioaccumulative, and toxic.
SRC = Site-related contaminant.
Bold = Chemical is a COPEC.

Table H-26. SRC and Integrated COPEC Screening with Maximum to OMZA Ratio for Surface Water at the Upper Cobbs Pond Exposure Unit

Analyte (mg/L)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Inorganic Chemicals														
Aluminum	7429-90-5	5/ 5	0.0916	0.332	0.185	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	3.82
Antimony	7440-36-0	1/ 5	0.00094	0.00094	0.00215	0	No	Yes	Exceeds background	0.19	Ohio Administrative Code	No	Below ESV	0.005
Arsenic	7440-38-2	2/ 5	0.00078	0.0025	0.00464	0.0032	No	No	Below background	0.15	Ohio Administrative Code	No	Below background	0.017
Barium	7440-39-3	5/ 5	0.0138	0.0226	0.0168	0.0475	No	No	Below background	0.22	Ohio Administrative Code	No	Below background	0.10
Calcium	7440-70-2	5/ 5	13.2	24.3	19.6	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	2/ 5	0.00059	0.001	0.00108	0	No	Yes	Exceeds background	0.086	Ohio Administrative Code[d]	No	Below ESV	0.012
Copper	7440-50-8	3/ 5	0.0019	0.0051	0.00248	0.0079	No	No	Below background	0.0093	Ohio Administrative Code[d]	No	Below background	0.55
Iron	7439-89-6	5/ 5	0.419	1.3	0.918	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	1.18
Lead	7439-92-1	3/ 5	0.00039	0.0033	0.00158	0	No	Yes	Exceeds background	0.0064	Ohio Administrative Code[d]	No	Below ESV	0.516
Magnesium	7439-95-4	5/ 5	1.75	4.41	3.36	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**5/ 5**	**0.0772**	**0.528**	**0.216**	**0.391**	**No**	**Yes**	**Exceeds background**	**0.12**	**Tier II (Suter & Tsao 1996)**	**Yes**	**Exceeds ESV**	**4.4**
Nickel	7440-02-0	1/ 5	0.0019	0.0019	0.00178	0	No	Yes	Exceeds background	0.052	Ohio Administrative Code[d]	No	Below ESV	0.037
Potassium	7440-09-7	5/ 5	0.894	1.57	1.26	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	1/ 5	0.00024	0.00024	0.00243	0	No	Yes	Exceeds background	0.005	Ohio Administrative Code	No	Below ESV	0.05
Sodium	7440-23-5	5/ 5	1.41	3.68	2.42	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Vanadium	7440-62-2	1/ 5	0.00089	0.00089	0.00104	0	No	Yes	Exceeds background	0.044	Ohio Administrative Code	No	Below ESV	0.020
Zinc	7440-66-6	4/ 5	0.0041	0.0115	0.00984	0.042	No	No	Below background	0.12	Ohio Administrative Code	No	Below background	0.096
Anions														
Nitrate/Nitrite (NO3/NO2-N)	**N599**	**2/ 4**	**0.1**	**0.18**	**0.087**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfate	**14808-79-8**	**2/ 2**	**13**	**13**	**13**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfide[e]	**18496-25-8**	**2/ 2**	**0.7**	**0.7**	**0.7**	**0**	**No**	**Yes**	**Detected no background**	**0.002**	**NAWQC 2009**	**Yes**	**Exceeds ESV**	**350**
Miscellaneous														
Total Phosphorus as P	7723-14-0	2/ 2	0.06	0.24	0.15	0	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Explosives														
4-Amino-2,6-Dinitrotoluene	19406-51-0	2/ 3	0.000072	0.00024	0.000147	0	No	Yes	Detected organic	0.011	Ohio Administrative Code	No	Below ESV	0.022
Semi-volatile Organic Compound														
Bis(2-ethylhexyl)phthalate	117-81-7	2/ 3	0.0019	0.002	0.00313	0	No	Yes	Detected organic	0.0084	Ohio Administrative Code	No	Below ESV	0.24
Di-n-butyl phthalate	84-74-2	2/ 3	0.0018	0.0046	0.0038	0	No	Yes	Detected organic	0.019	Tier II (GLI database)	No	Below ESV	0.24

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 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 EPA Risk Assessment Guidance and letter from Ohio EPA is Ohio EPA OMZA, followed by NAWQC or Tier II values, followed by U.S. Environmental Protection Agency Region 5 ecological screening levels.

[d]Value is hardness dependent.

[e]In the source document, sulfide is listed under "sulfide-hydrogen sulfide," and the CAS number in the ESV table is, therefore, the one for hydrogen sulfide. Thus, the CAS numbers for sulfide and (hydrogen) sulfide listed in the ESV table do not match.

CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern/
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
Max = Maximum.
mg/L = Milligrams per liter.
Min = Minimum.
NAWQC = National Ambient Water Quality Criteria.
OMZA = Outside Mixing Zone Average.
PBT = Persistent, bioaccumulative, and toxic.
SRC = Site-related contaminant.
Bold = Chemical is a COPEC.

Table H-27. SRC and Integrated COPEC Screening with Maximum to OMZM Ratio for Surface Water at the Lower Cobbs Pond Exposure Unit

Analyte (mg/L)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Inorganic Chemicals														
Aluminum	7429-90-5	7/ 7	0.114	0.377	0.218	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	4.33
Antimony	7440-36-0	4/ 7	0.00073	0.0034	0.00163	0	No	Yes	Exceeds background	0.9	Ohio Administrative Code	No	Below ESV	0.004
Arsenic	7440-38-2	4/ 7	0.00078	0.0024	0.00371	0.0032	No	No	Below background	0.34	Ohio Administrative Code	No	Below background	0.01
Barium	7440-39-3	7/ 7	0.0117	0.0228	0.0141	0.0475	No	No	Below background	2	Ohio Administrative Code	No	Below background	0.01
Beryllium	7440-41-7	1/ 7	0.000034	0.000034	0.000196	0	No	Yes	Exceeds background	0.093	Ohio Administrative Code[d]	No	Below ESV	0.0004
Cadmium	7440-43-9	1/ 7	0.000043	0.000043	0.000389	0	No	Yes	Exceeds background	0.0045	Ohio Administrative Code[d]	No	Below ESV	0.01
Calcium	7440-70-2	7/ 7	10.9	38.7	20.4	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	2/ 7	0.00053	0.0011	0.00128	0	No	Yes	Exceeds background	1.8	Ohio Administrative Code	No	Below ESV	0.001
Cobalt	7440-48-4	1/ 7	0.00015	0.00015	0.000691	0	No	Yes	Exceeds background	0.22	Ohio Administrative Code	No	Below ESV	0.001
Copper	7440-50-8	4/ 7	0.0016	0.0029	0.0018	0.0079	No	No	Below background	0.014	Ohio Administrative Code[d]	No	Below background	0.21
Iron	7439-89-6	7/ 7	0.294	1.35	0.69	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	1.35
Lead	7439-92-1	3/ 7	0.00029	0.0029	0.0015	0	No	Yes	Exceeds background	0.12	Ohio Administrative Code[d]	No	Below ESV	0.024
Magnesium	7439-95-4	7/ 7	1.55	6.71	3.6	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**7/ 7**	**0.0915**	**0.654**	**0.215**	**0.391**	**No**	**Yes**	**Exceeds background**	**0.12**	**Tier II (Suter & Tsao 1996)**	**Yes**	**Exceeds ESV**	**5.45**
Nickel	7440-02-0	2/ 7	0.0014	0.0016	0.00161	0	No	Yes	Exceeds background	0.47	Ohio Administrative Code[d]	No	Below ESV	0.003
Potassium	7440-09-7	7/ 7	0.497	1.61	1.23	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	1/ 7	0.00032	0.00032	0.00245	0	No	Yes	Exceeds background	0.005	NAWQC 2009	No	Below ESV	0.06
Sodium	7440-23-5	7/ 7	1.37	4.4	2.52	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	1/ 7	0.00035	0.00035	0.00348	0	No	Yes	Exceeds background	0.079	Ohio Administrative Code	No	Below ESV	0.004
Vanadium	7440-62-2	5/ 7	0.00063	0.003	0.00196	0	No	Yes	Exceeds background	0.15	Ohio Administrative Code	No	Below ESV	0.02
Zinc	7440-66-6	5/ 7	0.0027	0.0139	0.0111	0.042	No	No	Below background	0.12	Ohio Administrative Code	No	Below background	0.12
Anions														
Nitrate/Nitrite (NO3/NO2-N)	**N599**	**2/ 5**	**0.1**	**0.13**	**0.0664**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfate	**14808-79-8**	**3/ 3**	**14**	**19**	**16.3**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfide[e]	**18496-25-8**	**1/ 3**	**0.7**	**0.7**	**0.4**	**0**	**No**	**Yes**	**Detected no background**	**0.002**	**NAWQC 2009**	**Yes**	**Exceeds ESV**	**350**
Miscellaneous														
Total Phosphorus as P	7723-14-0	2/ 2	0.1	0.12	0.11	0	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Explosives														
4-Amino-2,6-Dinitrotoluene	19406-51-0	1/ 4	0.00029	0.00029	0.000143	0	No	Yes	Detected organic	0.011	Ohio Administrative Code	No	Below ESV	0.003
Semi-volatile Organic Compounds														
Benzenemethanol	100-51-6	1/ 2	0.0049	0.0049	0.00495	0	No	Yes	Detected organic	0.0086	Tier II (Suter & Tsao 1996)	No	Below ESV	0.57
Bis(2-ethylhexyl)phthalate	117-81-7	2/ 4	0.0022	0.0029	0.00378	0	No	Yes	Detected organic	1.1	Ohio Administrative Code	No	Below ESV	0.003
Butyl benzyl phthalate	85-68-7	1/ 4	0.0018	0.0018	0.00433	0	No	Yes	Detected organic	0.13	Ohio Administrative Code	No	Below ESV	0.01
Di-n-butyl phthalate	84-74-2	2/ 4	0.0023	0.012	0.00608	0	No	Yes	Detected organic	0.019	Tier II (GLI database)	No	Below ESV	0.63

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 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 EPA Risk Assessment Guidance and letter from Ohio EPA is Ohio EPA OMZM, followed by NAWQC or Tier II values, followed by U.S. Environmental Protection Agency Region 5 ecological screening levels.

[d]Value is hardness dependent.

[e]In the source document, sulfide is listed under "sulfide-hydrogen sulfide," and the CAS number in the ESV table is, therefore, the one for hydrogen sulfide. Thus, the CAS numbers for sulfide and (hydrogen) sulfide listed in the ESV table do not match.

CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
Max = Maximum.
mg/L = Milligrams per liter.
Min = Minimum.
NAWQC = National Ambient Water Quality Criteria.
OMZM = Outside mixing zone maximum.
PBT = Persistent, bioaccumulative, and toxic.
SRC = Site-related contaminant.
Bold = Chemical is a COPEC.

Table H-28. SRC and Integrated COPEC Screening with Maximum to OMZA Ratio for Surface Water at the Lower Cobbs Pond Exposure Unit

Analyte (mg/L)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Max to ESV
Inorganic Chemicals														
Aluminum	7429-90-5	7/ 7	0.114	0.377	0.218	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	4.33
Antimony	7440-36-0	4/ 7	0.00073	0.0034	0.00163	0	No	Yes	Exceeds background	0.19	Ohio Administrative Code	No	Below ESV	0.018
Arsenic	7440-38-2	4/ 7	0.00078	0.0024	0.00371	0.0032	No	No	Below background	0.15	Ohio Administrative Code	No	Below background	0.016
Barium	7440-39-3	7/ 7	0.0117	0.0228	0.0141	0.0475	No	No	Below background	0.22	Ohio Administrative Code	No	Below background	0.10
Beryllium	7440-41-7	1/ 7	0.000034	0.000034	0.000196	0	No	Yes	Exceeds background	0.011	Ohio Administrative Code[d]	No	Below ESV	0.003
Cadmium	7440-43-9	1/ 7	0.000043	0.000043	0.000389	0	No	Yes	Exceeds background	0.0025	Ohio Administrative Code[d]	No	Below ESV	0.017
Calcium	7440-70-2	7/ 7	10.9	38.7	20.4	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	2/ 7	0.00053	0.0011	0.00128	0	No	Yes	Exceeds background	0.086	Ohio Administrative Code	No	Below ESV	0.013
Cobalt	7440-48-4	1/ 7	0.00015	0.00015	0.000691	0	No	Yes	Exceeds background	0.024	Ohio Administrative Code	No	Below ESV	0.006
Copper	7440-50-8	4/ 7	0.0016	0.0029	0.0018	0.0079	No	No	Below background	0.0093	Ohio Administrative Code[d]	No	Below background	0.31
Iron	7439-89-6	7/ 7	0.294	1.35	0.69	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	0.81
Lead	7439-92-1	3/ 7	0.00029	0.0029	0.0015	0	No	Yes	Exceeds background	0.0064	Ohio Administrative Code[d]	No	Below ESV	0.45
Magnesium	7439-95-4	7/ 7	1.55	6.71	3.6	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**7/ 7**	**0.0915**	**0.654**	**0.215**	**0.391**	**No**	**Yes**	**Exceeds background**	**0.12**	**Tier II (Suter & Tsao 1996)**	**Yes**	**Exceeds ESV**	**5.45**
Nickel	7440-02-0	2/ 7	0.0014	0.0016	0.00161	0	No	Yes	Exceeds background	0.052	Ohio Administrative Code[d]	No	Below ESV	0.031
Potassium	7440-09-7	7/ 7	0.497	1.61	1.23	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	1/ 7	0.00032	0.00032	0.00245	0	No	Yes	Exceeds background	0.005	Ohio Administrative Code	No	Below ESV	0.06
Sodium	7440-23-5	7/ 7	1.37	4.4	2.52	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	1/ 7	0.00035	0.00035	0.00348	0	No	Yes	Exceeds background	0.017	Ohio Administrative Code	No	Below ESV	0.021
Vanadium	7440-62-2	5/ 7	0.00063	0.003	0.00196	0	No	Yes	Exceeds background	0.044	Ohio Administrative Code	No	Below ESV	0.068
Zinc	7440-66-6	5/ 7	0.0027	0.0139	0.0111	0.042	No	No	Below background	0.12	Ohio Administrative Code	No	Below background	0.116
Anions														
Nitrate/Nitrite (NO3/NO2-N)	**N599**	**2/ 5**	**0.1**	**0.13**	**0.0664**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfate	**14808-79-8**	**3/ 3**	**14**	**19**	**16.3**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfide[e]	**18496-25-8**	**1/ 3**	**0.7**	**0.7**	**0.4**	**0**	**No**	**Yes**	**Detected no background**	**0.002**	**NAWQC 2009**	**Yes**	**Exceeds ESV**	**350**
Miscellaneous														
Total Phosphorus as P	7723-14-0	2/ 2	0.1	0.12	0.11	0	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Explosives														
4-Amino-2,6-Dinitrotoluene	19406-51-0	1/ 4	0.00029	0.00029	0.000143	0	No	Yes	Detected organic	0.011	Ohio Administrative Code	No	Below ESV	0.026
Semi-volatile Organic Compounds														
Benzenemethanol	100-51-6	1/ 2	0.0049	0.0049	0.00495	0	No	Yes	Detected organic	0.0086	Tier II (Suter & Tsao 1996)	No	Below ESV	0.57
Bis(2-ethylhexyl)phthalate	117-81-7	2/ 4	0.0022	0.0029	0.00378	0	No	Yes	Detected organic	1.1	Ohio Administrative Code	No	Below ESV	0.35
Butyl benzyl phthalate	85-68-7	1/ 4	0.0018	0.0018	0.00433	0	No	Yes	Detected organic	0.13	Ohio Administrative Code	No	Below ESV	0.078
Di-n-butyl phthalate	84-74-2	2/ 4	0.0023	0.012	0.00608	0	No	Yes	Detected organic	0.019	Tier II (GLI database)	No	Below ESV	0.63

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 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 EPA risk assessment guidance and letter from Ohio EPA is Ohio EPA OMZA, followed by NAWQC or Tier II values, followed by U.S. Environmental Protection Agency Region 5 ecological screening levels.

[d]Value is hardness dependent.

[e]In the source document, sulfide is listed under "sulfide-hydrogen sulfide," and the CAS number in the ESV table is, therefore, the one for hydrogen sulfide. Thus, the CAS numbers for sulfide and (hydrogen) sulfide listed in the ESV table do not match.

CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
Max = Maximum.
mg/L = Milligrams per liter.
Min = Minimum.
NAWQC = National Ambient Water Quality Criteria.
OMZA = Outside mixing zone average.
PBT = Persistent, Bioaccumulative, and Toxic.
SRC = Site-related contaminant.
Bold = Chemical is a COPEC.

Table H-29. SRC and Integrated COPEC Screening with Average Ratio for Shallow Surface Soil (0-1 ft bgs Discrete Samples) at the Upper and Lower Cobbs Ponds AOC

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	PBT[b] Compound ? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Average to ESV
Inorganic Chemicals														
Aluminum	**7429-90-5**	**24/ 24**	**6450**	**19200**	**11900**	**17700**	**No**	**Yes**	**Exceeds background**	**50**	**PRGs**	**Yes**	**Exceeds ESV**	**238**
Antimony	7440-36-0	10/ 17	0.086	0.46	0.22	0.96	No	No	Below background	0.27	EcoSSL	No	Below background	0.81
Arsenic	7440-38-2	24/ 24	4.2	28.4	11.1	15.4	No	Yes	Exceeds background	18	EcoSSL	No	Average below ESV	0.62
Barium	7440-39-3	24/ 24	35.2	90.4	61	88.4	No	Yes	Exceeds background	330	EcoSSL	No	Below ESV	0.18
Beryllium	7440-41-7	24/ 24	0.36	0.86	0.524	0.88	No	No	Below background	21	EcoSSL	No	Below background	0.02
Cadmium	7440-43-9	19/ 24	0.053	0.49	0.135	0	No	Yes	Exceeds background	0.36	EcoSSL	No	Average below ESV	0.38
Calcium	7440-70-2	24/ 24	195	4040	1310	15800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	24/ 24	9.6	24.8	15.4	17.4	No	Yes	Exceeds background	26	EcoSSL	No	Below ESV	0.59
Chromium, hexavalent	18540-29-9	1/ 1	1	1	1	0	No	Yes	Exceeds background	130	EcoSSL	No	Below ESV	0.008
Cobalt	7440-48-4	24/ 24	4.5	16.4	8.9	10.4	No	Yes	Exceeds background	13	EcoSSL	No	Average below ESV	0.68
Copper	7440-50-8	24/ 24	4.2	23.9	14.1	17.7	No	Yes	Exceeds background	28	EcoSSL	No	Below ESV	0.50
Cyanide	57-12-5	4/ 11	0.31	1.2	0.292	0	No	Yes	Exceeds background	1.33	USEPA Reg 5	No	Below ESV	0.22
Iron	7439-89-6	24/ 24	13400	44000	23000	23100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	**7439-92-1**	**24/ 24**	**10.6**	**31.3**	**18.7**	**26.1**	**No**	**Yes**	**Exceeds background**	**11**	**EcoSSL**	**Yes**	**Exceeds ESV**	**1.70**
Magnesium	7439-95-4	24/ 24	1340	4310	2560	3030	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	24/ 24	78.6	667	281	1450	No	No	Below background	220	EcoSSL	No	Below background	1.28
Mercury	**7439-97-6**	**21/ 24**	**0.021**	**0.074**	**0.043**	**0.036**	**Yes**	**Yes**	**Exceeds background PBT Compound**	**0.00051**	**PRGs**	**Yes**	**Exceeds ESV PBT Compound**	**84.31**
Nickel	7440-02-0	24/ 24	8.6	27.2	17	21.1	No	Yes	Exceeds background	38	EcoSSL	No	Below ESV	0.45
Potassium	7440-09-7	24/ 24	508	2220	1020	927	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	21/ 24	0.48	1.4	0.813	1.4	No	No	Below background	0.52	EcoSSL	No	Below background	1.56
Silver	7440-22-4	9/ 24	0.032	0.45	0.0996	0	No	Yes	Exceeds background	4.2	EcoSSL	No	Below ESV	0.02
Sodium	7440-23-5	24/ 24	38.4	159	74	123	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	14/ 24	0.11	0.25	0.173	0	No	Yes	Exceeds background	1	PRGs	No	Below ESV	0.17
Vanadium	**7440-62-2**	**24/ 24**	**14.1**	**35.3**	**20.9**	**31.1**	**No**	**Yes**	**Exceeds background**	**7.8**	**EcoSSL**	**Yes**	**Exceeds background**	**2.68**
Zinc	**7440-66-6**	**24/ 24**	**47.7**	**121**	**63.9**	**61.8**	**No**	**Yes**	**Exceeds background**	**46**	**EcoSSL**	**Yes**	**Exceeds background**	**1.39**
Anions														
Nitrate/Nitrite (NO3/NO2-N)	**14797-55-8**	**1/ 11**	**1.4**	**1.4**	**0.545**	**0**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Explosives														
Nitrocellulose	**9004-70-0**	**3/ 3**	**1.2**	**1.5**	**1.4**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds														
2-Methylnaphthalene	91-57-6	1/ 14	0.0091	0.0091	0.293	0	No	Yes	Detected organic	3.24	USEPA Reg 5	No	Below ESV	0.090
Acenaphthylene	208-96-8	1/ 14	0.012	0.012	0.0459	0	No	Yes	Detected organic	682	USEPA Reg 5	No	Below ESV	6.73E-05
Benz(a)anthracene	56-55-3	3/ 14	0.017	0.066	0.0484	0	No	Yes	Detected organic	5.21	USEPA Reg 5	No	Below ESV	0.009
Benzenemethanol	100-51-6	1/ 13	0.44	0.44	0.337	0	No	Yes	Detected organic	65.8	USEPA Reg 5	No	Below ESV	0.005
Benzo(a)pyrene	50-32-8	3/ 14	0.014	0.057	0.0482	0	No	Yes	Detected organic	1.52	USEPA Reg 5	No	Below ESV	0.032
Benzo(b)fluoranthene	205-99-2	2/ 14	0.021	0.059	0.0506	0	No	Yes	Detected organic	59.8	USEPA Reg 5	No	Below ESV	8.46E-04
Benzo(ghi)perylene	191-24-2	1/ 14	0.031	0.031	0.0519	0	No	Yes	Detected organic	119	USEPA Reg 5	No	Below ESV	4.36E-04
Benzo(k)fluoranthene	207-08-9	1/ 14	0.028	0.028	0.0499	0	No	Yes	Detected organic	148	USEPA Reg 5	No	Below ESV	3.37E-04
Benzoic Acid	**65-85-0**	**1/ 13**	**17**	**17**	**2.05**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Bis(2-ethylhexyl)phthalate	117-81-7	1/ 14	0.23	0.23	0.304	0	No	Yes	Detected organic	0.925	USEPA Reg 5	No	Below ESV	0.33
Chrysene	218-01-9	2/ 14	0.014	0.048	0.0462	0	No	Yes	Detected organic	4.73	USEPA Reg 5	No	Below ESV	0.010
Di-n-butyl phthalate	84-74-2	2/ 14	0.021	0.027	0.27	0	No	Yes	Detected organic	200	PRGs	No	Below ESV	0.001

Table H-29. SRC and Integrated COPEC Screening with Average Ratio for Shallow Surface Soil (0-1 ft bgs Discrete Samples) at the Upper and Lower Cobbs Ponds AOC (continued)

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	PBT[b] Compound ? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Average to ESV
Fluoranthene	206-44-0	7/ 14	0.012	0.11	0.0549	0	No	Yes	Detected organic	122	USEPA Reg 5	No	Below ESV	4.50E-04
Indeno(1,2,3-cd)pyrene	193-39-5	1/ 14	0.026	0.026	0.0494	0	No	Yes	Detected organic	109	USEPA Reg 5	No	Below ESV	4.53E-04
Phenanthrene	85-01-8	4/ 14	0.0095	0.093	0.0506	0	No	Yes	Detected organic	45.7	USEPA Reg 5	No	Below ESV	0.001
Pyrene	129-00-0	7/ 14	0.011	0.079	0.0517	0	No	Yes	Detected organic	78.5	USEPA Reg 5	No	Below ESV	6.59E-04
Pesticides/PCBs														
beta-BHC	**319-85-7**	**1/ 3**	**0.0035**	**0.0035**	**0.00193**	**0**	**Yes**	**Yes**	**Detected organic PBT Compound**	**0.00398**	**USEPA Reg 5**	**Yes**	**PBT Compound**	**0.48**

[a]Background criteria for soil 0-1 ft bgs are from final facility-wide background values for the Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).

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

[c]Screening Level Source: See soil ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is EcoSSLs, followed by U.S. Department of Energy (DOE) (1997a) *Preliminary Remediation Goals for Ecological Endpoints*, followed by USEPA Region 5 ecological screening levels.

AOC = Area of concern.
bgs = Below ground surface.
CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
EcoSSL = Ecological soil screening level.
ESV = Ecological Screening Value.
Freq = Frequency.
ft = Feet.
Max = Maximum.
mg/kg = Milligrams per kilogram.
Min = Minimum.
PBT = Persistent, bioaccumulative, and toxic.
PCB = Polychlorinated biphenyl.
PRG = Preliminary remediation goal.
Reg = Region.
SRC = Site-related contaminant.
USEPA = U.S. Environmental Protection Agency.
Bold = Chemical is a COPEC.

Table H-30. SRC and Integrated COPEC Screening with Average Ratio for Sediment (Discrete Samples) at the Backwater Area Exposure Unit

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Average to ESV
Inorganic Chemicals															
Aluminum	7429-90-5	14/ 14	6620	18600	12500	13900	29000	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Antimony	**7440-36-0**	**11/ 14**	**0.24**	**2.1**	**0.607**	**0**	**1.3**	**No**	**Yes**	**Exceeds SRV**	**No ESV**	**No Source**	**Yes**	**Exceeds SRV**	**No ESV**
Arsenic	7440-38-2	14/ 14	3.5	16.7	10.2	19.5	25	No	No	Below background	9.79	MacDonald et al.	No	Below background	1.04
Barium	7440-39-3	14/ 14	53.8	151	99.5	123	190	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Beryllium	**7440-41-7**	**14/ 14**	**0.34**	**1.1**	**0.782**	**0.38**	**0.8**	**No**	**Yes**	**Exceeds SRV**	**No ESV**	**No Source**	**Yes**	**Exceeds SRV**	**No ESV**
Cadmium	7440-43-9	14/ 14	0.11	2.3	0.972	0	0.79	No	Yes	Exceeds SRV	0.99	MacDonald et al.	No	Average below ESV	0.98
Calcium	7440-70-2	14/ 14	1180	15400	3790	5510	21000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	14/ 14	9.9	56.5	23.3	18.1	29	No	Yes	Exceeds SRV	43.4	MacDonald et al.	No	Average below ESV	0.54
Cobalt	7440-48-4	14/ 14	5.4	22.8	13.6	9.1	12	No	Yes	Exceeds SRV	50	USEPA Reg 5	No	Below ESV	0.272
Copper	7440-50-8	14/ 14	10.9	62.3	28.2	27.6	32	No	Yes	Exceeds SRV	31.6	MacDonald et al.	No	Average below ESV	0.89
Cyanide	**57-12-5**	**3/ 12**	**0.1**	**0.55**	**0.224**	**0**	**--**	**No**	**Yes**	**Exceeds background**	**0.0001**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**2240**
Iron	7439-89-6	14/ 14	12700	36100	21400	28200	41000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	7439-92-1	14/ 14	14.2	57.9	29.6	27.4	47	No	Yes	Exceeds SRV	35.8	MacDonald et al.	No	Average below ESV	0.83
Magnesium	7439-95-4	14/ 14	1170	3830	2230	2760	7100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	14/ 14	179	999	520	1950	1500	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Mercury	**7439-97-6**	**13/ 14**	**0.031**	**0.11**	**0.0816**	**0.059**	**0.12**	**Yes**	**Yes**	**PBT Compound**	**0.18**	**MacDonald et al.**	**Yes**	**PBT Compound**	**0.45**
Nickel	7440-02-0	14/ 14	9.4	35.5	20.5	17.7	33	No	Yes	Exceeds SRV	22.7	MacDonald et al.	No	Average below ESV	0.90
Potassium	7440-09-7	14/ 14	541	1740	1140	1950	6800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	**7782-49-2**	**8/ 14**	**0.26**	**2.7**	**0.5**	**1.7**	**1.7**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Silver	**7440-22-4**	**13/ 14**	**0.51**	**23**	**5.7**	**0**	**0.43**	**No**	**Yes**	**Exceeds SRV**	**0.5**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**11.40**
Sodium	7440-23-5	14/ 14	55.2	239	140	112	--	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	1/ 14	0.16	0.16	0.196	0.89	4.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Vanadium	7440-62-2	14/ 14	11.7	30	19.9	26.1	40	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Zinc	7440-66-6	14/ 14	74.8	418	179	532	160	No	No	Below background	121	MacDonald et al.	No	Below background	1.48
Anions															
Nitrate/Nitrite (NO3/NO2-N)	**14797-55-8**	**1/ 12**	**2.2**	**2.2**	**0.804**	**0**	**--**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Explosives															
2,4,6-Trinitrotoluene	**118-96-7**	**6/ 14**	**0.049**	**0.32**	**0.0811**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
2,6-Dinitrotoluene	**606-20-2**	**1/ 14**	**0.16**	**0.16**	**0.0483**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.0398**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**1.21**
Nitrocellulose	**9004-70-0**	**4/ 4**	**2.5**	**10.4**	**4.75**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Tetryl	**479-45-8**	**1/ 14**	**0.024**	**0.024**	**0.0294**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds															
Anthracene	**120-12-7**	**2/ 5**	**0.074**	**0.22**	**0.0956**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.0572**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.671**
Benz(a)anthracene	**56-55-3**	**3/ 5**	**0.058**	**0.83**	**0.274**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.108**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**2.537**
Benzo(a)pyrene	**50-32-8**	**4/ 5**	**0.063**	**0.89**	**0.323**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.15**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**2.153**
Benzo(b)fluoranthene	205-99-2	3/ 5	0.1	0.86	0.338	0	--	No	Yes	Detected organic	10.4	USEPA Reg 5	No	Below ESV	0.03
Benzo(g,h,i)perylene	**191-24-2**	**3/ 5**	**0.05**	**0.49**	**0.22**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.17**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**1.29**
Benzo(k)fluoranthene	**207-08-9**	**3/ 5**	**0.044**	**0.8**	**0.265**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.24**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**1.10**
Bis(2-ethylhexyl)phthalate	117-81-7	1/ 5	0.16	0.16	0.165	0	--	No	Yes	Detected organic	0.182	USEPA Reg 5	No	Below ESV	0.91
Chrysene	**218-01-9**	**4/ 5**	**0.06**	**0.93**	**0.338**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.166**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**2.04**
Dibenz(a,h)anthracene	**53-70-3**	**1/ 5**	**0.066**	**0.066**	**0.095**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.033**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**2.88**
Fluoranthene	**206-44-0**	**3/ 5**	**0.11**	**1.8**	**0.61**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.423**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.44**

Table H-30. SRC and Integrated COPEC Screening with Average Ratio for Sediment (Discrete Samples) at the Backwater Area Exposure Unit (continued)

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Average to ESV
Fluorene	86-73-7	1/ 5	0.053	0.053	0.0844	0	--	No	Yes	Detected organic	0.0774	MacDonald et al.	No	Below ESV	1.09
Indeno(1,2,3-cd)pyrene	193-39-5	3/ 5	0.04	0.48	0.192	0	--	No	Yes	Detected organic	0.2	USEPA Reg 5	No	Average below ESV	0.96
Phenanthrene	**85-01-8**	**3/ 5**	**0.034**	**0.91**	**0.285**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.204**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.40**
Pyrene	**129-00-0**	**3/ 5**	**0.084**	**1.9**	**0.604**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.195**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**3.10**
Pesticides/PCBs															
PCB-1254[d]	**11097-69-1**	**2/ 4**	**0.046**	**0.047**	**0.0568**	**0**	**--**	**Yes**	**Yes**	**Detected organic PBT Compound**	**0.0598**	**MacDonald et al.**	**Yes**	**PBT Compound**	**0.95**
Volatile Organic Compounds															
2-Butanone	78-93-3	3/ 5	0.03	0.055	0.0256	0	--	No	Yes	Detected organic	0.0424	USEPA Reg 5	No	Average below ESV	0.60
Acetone	**67-64-1**	**5/ 5**	**0.02**	**0.19**	**0.12**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.0099**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**12.12**
Methylene chloride	75-09-2	1/ 5	0.048	0.048	0.0145	0	--	No	Yes	Detected organic	0.159	USEPA Reg 5	No	Below ESV	0.09

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; 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]ESV: See sediment ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is MacDonald et al. "Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems," *Arch. Environ. Contam. Toxicol.* **39**:1. January 2000; followed by USEPA Reg 5 ecological screening levels.

[d]ESV is for PCBs (total PCBs).

-- = SRV not available.
CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
Max = Maximum.
mg/kg = Milligrams per kilogram.
Min = Minimum.
PBT = Persistent, bioaccumulative, and toxic.
PCB = Polychlorinated biphenyl.
Reg = Region.
SRC = Site-related contaminant.
SRV = Sediment reference value.
USEPA = U.S. Environmental Protection Agency.
Bold = Chemical is a COPEC.

Table H-31. SRC and Integrated COPEC Screening with Average Ratio for Sediment (Discrete Samples) at the Upper Cobbs Pond Exposure Unit

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Average to ESV
Inorganic Chemicals															
Aluminum	7429-90-5	5/ 5	13400	21400	16500	13900	29000	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Antimony	**7440-36-0**	**5/ 5**	**0.21**	**1.9**	**0.78**	**0**	**1.3**	**No**	**Yes**	**Exceeds SRV**	**No ESV**	**No Source**	**Yes**	**Exceeds SRV**	**No ESV**
Arsenic	7440-38-2	5/ 5	5.1	18.8	12.3	19.5	25	No	No	Below background	9.79	MacDonald et al.	No	Below background	1.26
Barium	7440-39-3	5/ 5	58.7	157	106	123	190	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Beryllium	**7440-41-7**	**5/ 5**	**0.44**	**1.3**	**0.842**	**0.38**	**0.8**	**No**	**Yes**	**Exceeds SRV**	**No ESV**	**No Source**	**Yes**	**Exceeds SRV**	**No ESV**
Cadmium	7440-43-9	3/ 5	0.15	2.3	0.95	0	0.79	No	Yes	Exceeds SRV	0.99	MacDonald et al.	No	Average below ESV	0.96
Calcium	7440-70-2	5/ 5	771	5440	2780	5510	21000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	**7440-47-3**	**6/ 6**	**19.9**	**91.6**	**50.8**	**18.1**	**29**	**No**	**Yes**	**Exceeds SRV**	**43.4**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.17**
Chromium, hexavalent	**18540-29-9**	**1/ 5**	**10.6**	**10.6**	**2.73**	**0**	**--**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Cobalt	7440-48-4	5/ 5	5.9	19.3	13.3	9.1	12	No	Yes	Exceeds SRV	50	USEPA Reg 5	No	Below ESV	0.27
Copper	**7440-50-8**	**5/ 5**	**14.1**	**106**	**57.1**	**27.6**	**32**	**No**	**Yes**	**Exceeds SRV**	**31.6**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.81**
Iron	7439-89-6	5/ 5	18300	41800	30300	28200	41000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	7439-92-1	5/ 5	13.1	52.4	27.7	27.4	47	No	Yes	Exceeds SRV	35.8	MacDonald et al.	No	Average below ESV	0.77
Magnesium	7439-95-4	5/ 5	2370	3690	3150	2760	7100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	5/ 5	138	712	438	1950	1500	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Mercury	**7439-97-6**	**5/ 5**	**0.014**	**0.15**	**0.0662**	**0.059**	**0.12**	**Yes**	**Yes**	**Exceeds SRV PBT Compound**	**0.18**	**MacDonald et al.**	**Yes**	**PBT Compound**	**0.37**
Nickel	**7440-02-0**	**5/ 5**	**13.1**	**41.1**	**28.7**	**17.7**	**33**	**No**	**Yes**	**Exceeds SRV**	**22.7**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.26**
Potassium	7440-09-7	5/ 5	1060	2100	1730	1950	6800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	**7782-49-2**	**3/ 5**	**0.22**	**2.9**	**0.839**	**1.7**	**1.7**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Silver	**7440-22-4**	**3/ 5**	**0.55**	**11**	**3.81**	**0**	**0.43**	**No**	**Yes**	**Exceeds SRV**	**0.5**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**7.62**
Sodium	7440-23-5	5/ 5	82.7	340	156	112	--	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	2/ 5	0.24	0.37	0.237	0.89	4.7	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Vanadium	7440-62-2	5/ 5	23.3	33.4	27.8	26.1	40	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Zinc	7440-66-6	5/ 5	71.3	479	240	532	160	No	No	Below background	121	MacDonald et al.	No	Below background	1.98
Explosives															
1,3-Dinitrobenzene	**99-65-0**	**1/ 5**	**0.036**	**0.036**	**0.0144**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.00861**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**1.67**
2,4,6-Trinitrotoluene	**118-96-7**	**2/ 5**	**0.087**	**0.15**	**0.0575**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
4-Amino-2,6-Dinitrotoluene	**19406-51-0**	**1/ 1**	**0.12**	**0.12**	**0.12**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
HMX	**2691-41-0**	**1/ 5**	**0.083**	**0.083**	**0.0606**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Nitrocellulose	**9004-70-0**	**2/ 2**	**2**	**5.7**	**3.85**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Tetryl	**479-45-8**	**1/ 5**	**0.019**	**0.019**	**0.021**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds															
Benz(a)anthracene	56-55-3	1/ 2	0.078	0.078	0.0615	0	--	No	Yes	Detected organic	0.108	MacDonald et al.	No	Below ESV	0.569
Benzo(a)pyrene	50-32-8	1/ 2	0.12	0.12	0.0845	0	--	No	Yes	Detected organic	0.15	MacDonald et al.	No	Below ESV	0.563
Benzo(b)fluoranthene	205-99-2	1/ 2	0.19	0.19	0.14	0	--	No	Yes	Detected organic	10.4	USEPA Reg 5	No	Below ESV	0.01
Benzo(g,h,i)perylene	191-24-2	1/ 2	0.11	0.11	0.12	0	--	No	Yes	Detected organic	0.17	USEPA Reg 5	No	Below ESV	0.71
Benzo(k)fluoranthene	207-08-9	1/ 2	0.067	0.067	0.081	0	--	No	Yes	Detected organic	0.24	USEPA Reg 5	No	Below ESV	0.34
Chrysene	218-01-9	1/ 2	0.11	0.11	0.072	0	--	No	Yes	Detected organic	0.166	MacDonald et al.	No	Below ESV	0.43
Fluoranthene	206-44-0	1/ 2	0.22	0.22	0.15	0	--	No	Yes	Detected organic	0.423	MacDonald et al.	No	Below ESV	0.35
Indeno(1,2,3-cd)pyrene	193-39-5	1/ 2	0.09	0.09	0.0925	0	--	No	Yes	Detected organic	0.2	USEPA Reg 5	No	Below ESV	0.46
Phenanthrene	85-01-8	1/ 2	0.07	0.07	0.065	0	--	No	Yes	Detected organic	0.204	MacDonald et al.	No	Below ESV	0.32
Pyrene	129-00-0	1/ 2	0.18	0.18	0.15	0	--	No	Yes	Detected organic	0.195	MacDonald et al.	No	Below ESV	0.77

Table H-31. SRC and Integrated COPEC Screening with Average Ratio for Sediment (Discrete Samples) at the Upper Cobbs Pond Exposure Unit (continued)

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Average to ESV
Pesticides/PCBs															
PCB-1254[d]	**11097-69-1**	**1/ 2**	**0.032**	**0.032**	**0.0685**	**0**	**--**	**Yes**	**Yes**	**Detected organic PBT Compound**	**0.0598**	**MacDonald et al.**	**Yes**	**PBT Compound**	**1.15**
Volatile Organic Compounds															
2-Butanone	78-93-3	2/ 2	0.022	0.033	0.0275	0	--	No	Yes	Detected organic	0.0424	USEPA Reg 5	No	Below ESV	0.65
Acetone	**67-64-1**	**2/ 2**	**0.088**	**0.091**	**0.0895**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.0099**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**9.04**

[a]Background criteria for sediment are from final facility-wide background values for the Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).
[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; 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]ESV: See sediment ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is MacDonald et al. "Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems," *Arch. Environ. Contam. Toxicol.* **39**:1. January 2000; followed by USEPA Reg 5 ESLs.
[d]ESV is for PCBs (total PCBs).
-- = SRV not available.
CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
Max = Maximum.
mg/kg = Milligrams per kilogram.
Min = Minimum.
PBT = Persistent, bioaccumulative, and toxic.
PCB = Polychlorinated biphenyl.
Reg = Region.
SRC = Site-related contaminant.
SRV = Sediment reference value.
USEPA = U.S. Environmental Protection Agency.
Bold = Chemical is a COPEC.

Table H-32. SRC and Integrated COPEC Screening with Average Ratio for Sediment (Discrete Samples) at the Lower Cobbs Pond Exposure Unit

Analyte (mg/kg)	CAS Number	Freq of Detect	MinDetect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Average to ESV
Inorganic Chemicals															
Aluminum	7429-90-5	8/ 8	8920	16400	12800	13900	29000	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Antimony	**7440-36-0**	**1/ 8**	**1.4**	**1.4**	**0.328**	**0**	**1.3**	**No**	**Yes**	**Exceeds SRV**	**No ESV**	**No Source**	**Yes**	**Exceeds SRV**	**No ESV**
Arsenic	**7440-38-2**	**8/ 8**	**5.1**	**34.3**	**14.9**	**19.5**	**25**	**No**	**Yes**	**Exceeds SRV**	**9.79**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.52**
Barium	7440-39-3	8/ 8	51.3	149	84.8	123	190	No	No	Below SRV	No ESV	No Source	No	Below SRV	No ESV
Beryllium	**7440-41-7**	**8/ 8**	**0.42**	**0.93**	**0.679**	**0.38**	**0.8**	**No**	**Yes**	**Exceeds SRV**	**No ESV**	**No Source**	**Yes**	**Exceeds SRV**	**No ESV**
Cadmium	7440-43-9	6/ 8	0.1	1.5	0.536	0	0.79	No	Yes	Exceeds SRV	0.99	MacDonald et al.	No	Average below ESV	0.54
Calcium	7440-70-2	8/ 8	699	7360	2670	5510	21000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	**7440-47-3**	**8/ 8**	**11.9**	**150**	**59**	**18.1**	**29**	**No**	**Yes**	**Exceeds SRV**	**43.4**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.36**
Chromium, hexavalent	**18540-29-9**	**2/ 6**	**5**	**5.7**	**2.12**	**--**	**--**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Cobalt	7440-48-4	8/ 8	8.6	21.3	12	9.1	12	No	Yes	Exceeds SRV	50	USEPA Reg 5	No	Below ESV	0.24
Copper	**7440-50-8**	**8/ 8**	**12.4**	**149**	**56.6**	**27.6**	**32**	**No**	**Yes**	**Exceeds SRV**	**31.6**	**MacDonald et al.**	**Yes**	**Exceeds ESV**	**1.79**
Cyanide	**57-12-5**	**1/ 6**	**0.4**	**0.4**	**0.225**	**0**	**--**	**No**	**Yes**	**Exceeds background**	**0.0001**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**2250**
Iron	7439-89-6	8/ 8	15800	32200	23800	28200	41000	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Lead	7439-92-1	8/ 8	12.3	60.4	29.4	27.4	47	No	Yes	Exceeds SRV	35.8	MacDonald et al.	No	Average below ESV	0.82
Magnesium	7439-95-4	8/ 8	2140	3240	2610	2760	7100	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	7439-96-5	8/ 8	217	966	502	1950	1500	No	No	Below background	No ESV	No Source	No	Below background	No ESV
Mercury	**7439-97-6**	**7/ 8**	**0.016**	**0.093**	**0.0538**	**0.059**	**0.12**	**Yes**	**Yes**	**PBT Compound**	**0.18**	**MacDonald et al.**	**Yes**	**PBT Compound**	**0.30**
Nickel	7440-02-0	8/ 8	15.3	30.2	20.4	17.7	33	No	No	Below SRV	22.7	MacDonald et al.	No	Below SRV	0.90
Potassium	7440-09-7	8/ 8	673	1860	1390	1950	6800	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	**7782-49-2**	**4/ 8**	**0.45**	**2.2**	**0.72**	**1.7**	**1.7**	**No**	**Yes**	**Exceeds background**	**No ESV**	**No Source**	**Yes**	**Exceeds background**	**No ESV**
Silver	**7440-22-4**	**5/ 8**	**0.052**	**2.4**	**0.852**	**0**	**0.43**	**No**	**Yes**	**Exceeds SRV**	**0.5**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**1.70**
Sodium	7440-23-5	8/ 8	47.3	190	119	112	--	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	2/ 8	0.13	0.41	0.179	0.89	4.7	No	No	Below background	No ESV	No Source	No	Below background	1.98
Vanadium	7440-62-2	8/ 8	15.3	32.2	22.5	26.1	40	No	No	Below SRV	No ESV	No Source	No	Below SRV	1.67
Zinc	7440-66-6	8/ 8	44.6	275	141	532	160	No	No	Below background	121	MacDonald et al.	No	Below background	No ESV
Explosives															
HMX	**2691-41-0**	**1/ 8**	**0.017**	**0.017**	**0.0596**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Nitrocellulose	**9004-70-0**	**1/ 1**	**7.8**	**7.8**	**7.8**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Tetryl	**479-45-8**	**1/ 8**	**0.022**	**0.022**	**0.0344**	**0**	**--**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Semi-volatile Organic Compounds															
Benz(a)anthracene	56-55-3	2/ 3	0.021	0.045	0.0437	0	--	No	Yes	Detected organic	0.108	MacDonald et al.	No	Below ESV	0.405
Benzo(a)pyrene	50-32-8	2/ 3	0.02	0.052	0.0473	0	--	No	Yes	Detected organic	0.15	MacDonald et al.	No	Below ESV	0.32
Benzo(b)fluoranthene	205-99-2	2/ 3	0.038	0.075	0.081	0	--	No	Yes	Detected organic	10.4	USEPA Reg 5	No	Below ESV	0.008
Benzo(g,h,i)perylene	191-24-2	2/ 3	0.014	0.045	0.0813	0	--	No	Yes	Detected organic	0.17	USEPA Reg 5	No	Below ESV	0.48
Benzo(k)fluoranthene	207-08-9	1/ 3	0.013	0.013	0.0993	0	--	No	Yes	Detected organic	0.24	USEPA Reg 5	No	Below ESV	0.41
Chrysene	218-01-9	2/ 3	0.027	0.052	0.0423	0	--	No	Yes	Detected organic	0.166	MacDonald et al.	No	Below ESV	0.25
Di-n-butyl phthalate	84-74-2	1/ 3	0.022	0.022	0.352	0	--	No	Yes	Detected organic	1.114	USEPA Reg 5	No	Below ESV	0.32
Fluoranthene	206-44-0	2/ 3	0.042	0.095	0.084	0	--	No	Yes	Detected organic	0.423	MacDonald et al.	No	Below ESV	0.20
Indeno(1,2,3-cd)pyrene	193-39-5	2/ 3	0.014	0.042	0.0637	0	--	No	Yes	Detected organic	0.2	USEPA Reg 5	No	Below ESV	0.32
Phenanthrene	85-01-8	1/ 3	0.014	0.014	0.0813	0	--	No	Yes	Detected organic	0.204	MacDonald et al.	No	Below ESV	0.40
Pyrene	129-00-0	2/ 3	0.032	0.083	0.095	0	--	No	Yes	Detected organic	0.195	MacDonald et al.	No	Below ESV	0.49

Table H-32. SRC and Integrated COPEC Screening with Average Ratio for Sediment (Discrete Samples) at the Lower Cobbs Pond Exposure Unit (continued)

Analyte (mg/kg)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	Ohio SRV	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC? (yes/no)	COPEC Justification	Ratio of Average to ESV
Volatile Organic Compounds															
2-Butanone	78-93-3	2/ 2	0.025	0.047	0.036	0	--	No	Yes	Detected organic	0.0424	USEPA Reg 5	No	Average below ESV	0.85
Acetone	**67-64-1**	**2/ 2**	**0.076**	**0.17**	**0.123**	**0**	**--**	**No**	**Yes**	**Detected organic**	**0.0099**	**USEPA Reg 5**	**Yes**	**Exceeds ESV**	**12.42**
Carbon Disulfide	75-15-0	1/ 2	0.0033	0.0033	0.0029	0	--	No	Yes	Detected organic	0.0239	USEPA Reg 5	No	Below ESV	0.12

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated bihpenyls; 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]ESV: See sediment ESV table. Hierarchy of values according to Ohio EPA Risk Assessment Guidance is MacDonald et al. "Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems," *Arch. Environ. Contam. Toxicol.* **39**:1. January 2000; followed by USEPA Reg 5 ecological screening levels.

-- = SRV not available.
CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
Max = Maximum.
mg/kg = Milligrams per kilogram.
Min = Minimum.
PBT = Persistent, bioaccumulative, and toxic.
Reg = Region.
SRC = Site-related contaminant.
SRV = Sediment reference value.
USEPA = U.S. Environmental Protection Agency.
Bold = Chemical is a COPEC.

Table H-33. SRC and Integrated COPEC Screening with Average to OMZA Ratio for Surface Water at the Backwater Area Exposure Unit

Analyte (mg/L)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC?[f] (yes/no)	COPEC Justification	Ratio of Average to ESV
Inorganic Chemicals														
Aluminum	7429-90-5	4/ 4	0.26	2.52	1.15	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	13.2
Antimony	7440-36-0	2/ 4	0.00096	0.001	0.00119	0	No	Yes	Exceeds background	0.19	Ohio Administrative Code	No	Below ESV	0.006
Arsenic	7440-38-2	4/ 4	0.0009	0.0104	0.00415	0.0032	No	Yes	Exceeds background	0.15	Ohio Administrative Code	No	Below ESV	0.028
Barium	7440-39-3	4/ 4	0.0198	0.382	0.141	0.0475	No	Yes	Exceeds background	0.22	Ohio Administrative Code	No	Below ESV	0.64
Beryllium	7440-41-7	2/ 4	0.000053	0.000064	0.000102	0	No	Yes	Exceeds background	0.011	Ohio Administrative Code[d]	No	Below ESV	0.009
Cadmium	7440-43-9	2/ 4	0.000057	0.000062	0.00011	0	No	Yes	Exceeds background	0.0025	Ohio Administrative Code[d]	No	Below ESV	0.044
Calcium	7440-70-2	4/ 4	21.6	67.7	37.4	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	4/ 4	0.00056	0.0067	0.00297	0	No	Yes	Exceeds background	0.086	Ohio Administrative Code[d]	No	Below ESV	0.035
Cobalt	7440-48-4	4/ 4	0.00039	0.0107	0.00423	0	No	Yes	Exceeds background	0.024	Ohio Administrative Code	No	Below ESV	0.18
Copper	7440-50-8	3/ 4	0.0019	0.0088	0.00355	0.0079	No	Yes	Exceeds background	0.0093	Ohio Administrative Code[d]	No	Below ESV	0.38
Iron	7439-89-6	4/ 4	0.846	16.3	7.64	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	7.64
Lead	7439-92-1	2/ 4	0.00032	0.00047	0.000698	0	No	Yes	Exceeds background	0.0064	Ohio Administrative Code[d]	No	Below ESV	0.11
Magnesium	7439-95-4	4/ 4	3.25	11.2	6.1	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**4/ 4**	**0.132**	**15.8**	**6.16**	**0.391**	**No**	**Yes**	**Exceeds background**	**0.12**	**Tier II (Suter & Tsao 1996)**	**Yes**	**Exceeds ESV**	**51.33**
Nickel	7440-02-0	4/ 4	0.0019	0.0067	0.0037	0	No	Yes	Exceeds background	0.052	Ohio Administrative Code[d]	No	Below ESV	0.071
Potassium	7440-09-7	4/ 4	1.39	15.7	6.1	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	3/ 4	0.00023	0.0104	0.00335	0	No	Yes	Exceeds background	0.005	Ohio Administrative Code	No	Below ESV	0.67
Silver	7440-22-4	1/ 4	0.0017	0.0017	0.000603	0	No	Yes	Exceeds background	0.0013	Ohio Administrative Code[d]	No	Below ESV	0.46
Sodium	7440-23-5	4/ 4	1.6	12.9	5.93	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	1/ 4	0.00046	0.00046	0.000865	0	No	Yes	Exceeds background	0.017	Ohio Administrative Code	No	Below ESV	0.051
Vanadium	7440-62-2	3/ 4	0.00051	0.005	0.00385	0	No	Yes	Exceeds background	0.044	Ohio Administrative Code	No	Below ESV	0.088
Zinc	7440-66-6	4/ 4	0.0101	0.109	0.0403	0.042	No	Yes	Exceeds background	0.12	Ohio Administrative Code	No	Below ESV	0.34
Anions														
Sulfate	**14808-79-8**	**1/ 2**	**29**	**29**	**15.1**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfide[e]	**18496-25-8**	**1/ 2**	**2.3**	**2.3**	**1.28**	**0**	**No**	**Yes**	**Detected no background**	**0.002**	**NAWQC 2009**	**Yes**	**Exceeds ESV**	**640**
Explosives														
4-Amino-2,6-Dinitrotoluene	19406-51-0	2/ 2	0.000043	0.00007	0.0000565	0	No	Yes	Detected organic	0.011	Ohio Administrative Code	No	Below ESV	0.005
Volatile Organic Compounds														
Acetone	67-64-1	1/ 3	0.003	0.003	0.00433	0	No	Yes	Detected organic	1.5	Tier II (Suter & Tsao 1996)	No	Below ESV	0.003
Chloromethane	**74-87-3**	**1/ 3**	**0.0007**	**0.0007**	**0.000567**	**0**	**No**	**Yes**	**Detected organic**	**No ESV**	**No Source**	**Yes**	**Detected organic**	**No ESV**
Toluene	108-88-3	1/ 3	0.001	0.001	0.000667	0	No	Yes	Detected organic	0.062	Ohio Administrative Code	No	Below ESV	0.011

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 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 EPA Risk Assessment Guidance and letter from Ohio EPA is Ohio EPA OMZA, followed by NAWQC or Tier II values, followed by U.S. Environmental Protection Agency Region 5 ecological screening levels.

[d]Value is hardness dependent.

[e]In the source document, sulfide is listed under "sulfide-hydrogen sulfide," and the CAS number in the ESV table is, therefore, the one for hydrogen sulfide. Thus, the CAS numbers for sulfide and (hydrogen) sulfide listed in the ESV table do not match.

[f]For average tables, SRCs are still determined by max detect, but COPECs and ratios are determined by average result. When average > max, COPECs are determined by the max detect.

CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value
Freq = Frequency.
Max = Maximum.
mg/L = Milligrams per liter.
Min = Minimum.
NAWQC = National Ambient Water Quality Criteria.
OMZA = Outside Mixing Zone Average.
PBT = Persistent, bioaccumulative, and toxic.
SRC = Site-related contaminant.
Bold = Chemical is a COPEC.

Table H-34. SRC and Integrated COPEC Screening with Average to OMZA Ratio for Surface Water at the Upper Cobbs Pond Exposure Unit

Analyte (mg/L)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC?[f] (yes/no)	COPEC Justification	Ratio of Average to ESV
Inorganic Chemicals														
Aluminum	7429-90-5	5/ 5	0.0916	0.332	0.185	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	2.13
Antimony	7440-36-0	1/ 5	0.00094	0.00094	0.00215	0	No	Yes	Exceeds background	0.19	Ohio Administrative Code	No	Below ESV	0.011
Arsenic	7440-38-2	2/ 5	0.00078	0.0025	0.00464	0.0032	No	No	Below background	0.15	Ohio Administrative Code	No	Below background	0.031
Barium	7440-39-3	5/ 5	0.0138	0.0226	0.0168	0.0475	No	No	Below background	0.22	Ohio Administrative Code	No	Below background	0.076
Calcium	7440-70-2	5/ 5	13.2	24.3	19.6	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	2/ 5	0.00059	0.001	0.00108	0	No	Yes	Exceeds background	0.086	Ohio Administrative Code[d]	No	Below ESV	0.013
Copper	7440-50-8	3/ 5	0.0019	0.0051	0.00248	0.0079	No	No	Below background	0.0093	Ohio Administrative Code[d]	No	Below background	0.27
Iron	7439-89-6	5/ 5	0.419	1.3	0.918	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	0.92
Lead	7439-92-1	3/ 5	0.00039	0.0033	0.00158	0	No	Yes	Exceeds background	0.0064	Ohio Administrative Code[d]	No	Below ESV	0.25
Magnesium	7439-95-4	5/ 5	1.75	4.41	3.36	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**5/ 5**	**0.0772**	**0.528**	**0.216**	**0.391**	**No**	**Yes**	**Exceeds background**	**0.12**	**Tier II (Suter & Tsao 1996)**	**Yes**	**Exceeds ESV**	**1.80**
Nickel	7440-02-0	1/ 5	0.0019	0.0019	0.00178	0	No	Yes	Exceeds background	0.052	Ohio Administrative Code[d]	No	Below ESV	0.034
Potassium	7440-09-7	5/ 5	0.894	1.57	1.26	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	1/ 5	0.00024	0.00024	0.00243	0	No	Yes	Exceeds background	0.005	Ohio Administrative Code	No	Below ESV	0.49
Sodium	7440-23-5	5/ 5	1.41	3.68	2.42	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Vanadium	7440-62-2	1/ 5	0.00089	0.00089	0.00104	0	No	Yes	Exceeds background	0.044	Ohio Administrative Code	No	Below ESV	0.024
Zinc	7440-66-6	4/ 5	0.0041	0.0115	0.00984	0.042	No	No	Below background	0.12	Ohio Administrative Code	No	Below background	0.08
Anions														
Nitrate/Nitrite (NO3/NO2-N)	**N599**	**2/ 4**	**0.1**	**0.18**	**0.087**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfate	**14808-79-8**	**2/ 2**	**13**	**13**	**13**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfide[e]	**18496-25-8**	**2/ 2**	**0.7**	**0.7**	**0.7**	**0**	**No**	**Yes**	**Detected no background**	**0.002**	**NAWQC 2009**	**Yes**	**Exceeds ESV**	**350**
Miscellaneous														
Total Phosphorus as P	7723-14-0	2/ 2	0.06	0.24	0.15	0	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Explosives														
4-Amino-2,6-Dinitrotoluene	19406-51-0	2/ 3	0.000072	0.00024	0.000147	0	No	Yes	Detected organic	0.011	Ohio Administrative Code	No	Below ESV	0.013
Semi-volatile Organic Compounds														
Bis(2-ethylhexyl)phthalate	117-81-7	2/ 3	0.0019	0.002	0.00313	0	No	Yes	Detected organic	0.0084	Ohio Administrative Code	No	Below ESV	0.37
Di-n-butyl phthalate	84-74-2	2/ 3	0.0018	0.0046	0.0038	0	No	Yes	Detected organic	0.019	Tier II (GLI database)	No	Below ESV	0.20

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated bihpenyls; 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 EPA Risk Assessment Guidance and letter from Ohio EPA is Ohio EPA OMZA, followed by NAWQC or Tier II values, followed by U.S. Environmental Protection Agency Region 5 ecological screening levels.

[d]Value is hardness dependent.

[e]In the source document, sulfide is listed under "sulfide-hydrogen sulfide," and the CAS number in the ESV table is, therefore, the one for hydrogen sulfide. Thus, the CAS numbers for sulfide and (hydrogen) sulfide listed in the ESV table do not match.

[f]For average tables, SRCs are still determined by max detect, but COPECs and ratios are determined by average result. When average > max, COPECs are determined by the max detect.

CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
Max = Maximum.
mg/L = Milligrams per liter.
Min = Minimum.
NAWQC = National Ambient Water Quality Criteria.
OMZA = Outside mixing zone average.
PBT = Persistent, bioaccumulative, and toxic.
SRC = Site-related contaminant.
Bold = Chemical is a COPEC.

Table H-35. SRC and Integrated COPEC Screening with Average to OMZA Ratio for Surface Water at the Lower Cobbs Pond Exposure Unit

Analyte (mg/L)	CAS Number	Freq of Detect	Min Detect	Max Detect	Average Result	Background Criteria[a]	PBT[b] Compound? (yes/no)	SRC? (yes/no)	SRC Justification	ESV	ESV Source[c]	COPEC?[f] (yes/no)	COPEC Justification	Ratio of Average to ESV
Inorganic Chemicals														
Aluminum	7429-90-5	7/ 7	0.114	0.377	0.218	3.37	No	No	Below background	0.087	NAWQC 2009	No	Below background	2.51
Antimony	7440-36-0	4/ 7	0.00073	0.0034	0.00163	0	No	Yes	Exceeds background	0.19	Ohio Administrative Code	No	Below ESV	0.009
Arsenic	7440-38-2	4/ 7	0.00078	0.0024	0.00371	0.0032	No	No	Below background	0.15	Ohio Administrative Code	No	Below background	0.025
Barium	7440-39-3	7/ 7	0.0117	0.0228	0.0141	0.0475	No	No	Below background	0.22	Ohio Administrative Code	No	Below background	0.064
Beryllium	7440-41-7	1/ 7	0.000034	0.000034	0.000196	0	No	Yes	Exceeds background	0.011	Ohio Administrative Code[d]	No	Below ESV	0.018
Cadmium	7440-43-9	1/ 7	0.000043	0.000043	0.000389	0	No	Yes	Exceeds background	0.0025	Ohio Administrative Code[d]	No	Below ESV	0.16
Calcium	7440-70-2	7/ 7	10.9	38.7	20.4	41.4	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Chromium	7440-47-3	2/ 7	0.00053	0.0011	0.00128	0	No	Yes	Exceeds background	0.086	Ohio Administrative Code	No	Below ESV	0.01
Cobalt	7440-48-4	1/ 7	0.00015	0.00015	0.000691	0	No	Yes	Exceeds background	0.024	Ohio Administrative Code	No	Below ESV	0.029
Copper	7440-50-8	4/ 7	0.0016	0.0029	0.0018	0.0079	No	No	Below background	0.0093	Ohio Administrative Code[d]	No	Below background	0.19
Iron	7439-89-6	7/ 7	0.294	1.35	0.69	2.56	No	No	Essential Nutrient	1	NAWQC 2009	No	Essential Nutrient	0.69
Lead	7439-92-1	3/ 7	0.00029	0.0029	0.0015	0	No	Yes	Exceeds background	0.12	Ohio Administrative Code[d]	No	Below ESV	0.23
Magnesium	7439-95-4	7/ 7	1.55	6.71	3.6	10.8	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Manganese	**7439-96-5**	**7/ 7**	**0.0915**	**0.654**	**0.215**	**0.391**	**No**	**Yes**	**Exceeds background**	**0.12**	**Tier II (Suter & Tsao 1996)**	**Yes**	**Exceeds ESV**	**1.79**
Nickel	7440-02-0	2/ 7	0.0014	0.0016	0.00161	0	No	Yes	Exceeds background	0.052	Ohio Administrative Code[d]	No	Below ESV	0.031
Potassium	7440-09-7	7/ 7	0.497	1.61	1.23	3.17	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Selenium	7782-49-2	1/ 7	0.00032	0.00032	0.00245	0	No	Yes	Exceeds background	0.005	Ohio Administrative Code	No	Below ESV	0.49
Sodium	7440-23-5	7/ 7	1.37	4.4	2.52	21.3	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Thallium	7440-28-0	1/ 7	0.00035	0.00035	0.00348	0	No	Yes	Exceeds background	0.017	Ohio Administrative Code	No	Below ESV	0.205
Vanadium	7440-62-2	5/ 7	0.00063	0.003	0.00196	0	No	Yes	Exceeds background	0.044	Ohio Administrative Code	No	Below ESV	0.045
Zinc	7440-66-6	5/ 7	0.0027	0.0139	0.0111	0.042	No	No	Below background	0.12	Ohio Administrative Code	No	Below background	0.09
Anions														
Nitrate/Nitrite (NO3/NO2-N)	**N599**	**2/ 5**	**0.1**	**0.13**	**0.0664**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfate	**14808-79-8**	**3/ 3**	**14**	**19**	**16.3**	**0**	**No**	**Yes**	**Detected no background**	**No ESV**	**No Source**	**Yes**	**Detected and no ESV**	**No ESV**
Sulfide[e]	**18496-25-8**	**1/ 3**	**0.7**	**0.7**	**0.4**	**0**	**No**	**Yes**	**Detected no background**	**0.002**	**NAWQC 2009**	**Yes**	**Exceeds ESV**	**200**
Miscellaneous														
Total Phosphorus as P	7723-14-0	2/ 2	0.1	0.12	0.11	0	No	No	Essential Nutrient	No ESV	No Source	No	Essential Nutrient	No ESV
Explosives														
4-Amino-2,6-Dinitrotoluene	19406-51-0	1/ 4	0.00029	0.00029	0.000143	0	No	Yes	Detected organic	0.011	Ohio Administrative Code	No	Below ESV	0.01
Semi-volatile Organic Compounds														
Benzenemethanol	100-51-6	1/ 2	0.0049	0.0049	0.00495	0	No	Yes	Detected organic	0.0086	Tier II (Suter & Tsao 1996)	No	Below ESV	0.58
Bis(2-ethylhexyl)phthalate	117-81-7	2/ 4	0.0022	0.0029	0.00378	0	No	Yes	Detected organic	0.0084	Ohio Administrative Code	No	Below ESV	0.45
Butyl benzyl phthalate	85-68-7	1/ 2	0.0018	0.0018	0.0034	0	No	Yes	Detected organic	0.023	Ohio Administrative Code	No	Below ESV	0.15
Di-n-butyl phthalate	84-74-2	2/ 4	0.0023	0.012	0.00608	0	No	Yes	Detected organic	0.019	Tier II (GLI database)	No	Below ESV	0.32

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

[b]PBT compounds are defined by the Ohio Environmental Protection Agency (Ohio EPA; 2008) as: aldrin/dieldrin; chlordane; 1,1'-(2,2,2trichloroethylidene)bis[4-chlorobenzene] (DDT) and metabolites (DDD+DDE); hexachlorobenzene; hexachlorobutadiene (hexachloro-1,3-butadiene); hexachlorocyclohexanes (BHCs, alpha-BHC, beta-BHC, delta-BHC); lindane (gammahexachlorocyclohexane); alkyl-lead; mercury and its compounds; mirex; photomirex; octachlorostyrene; polychlorinated biphenyls; 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 EPA Risk Assessment Guidance and letter from Ohio EPA is Ohio EPA OMZA, followed by NAWQC or Tier II values, followed by U.S. Environmental Protection Agency Region 5 ecological screening levels.

[d]Value is hardness dependent.

[e]In the source document, sulfide is listed under "sulfide-hydrogen sulfide," and the CAS number in the ESV table is, therefore, the one for hydrogen sulfide. Thus, the CAS numbers for sulfide and (hydrogen) sulfide listed in the ESV table do not match.

[f]For average tables, SRCs are still determined by max detect, but COPECs and ratios are determined by average result. When average > max, COPECs are determined by the max detect.

CAS = Chemical Abstract Service.
COPEC = Chemical of potential ecological concern.
Detect = Detection.
ESV = Ecological screening value.
Freq = Frequency.
Max = Maximum.
mg/L = Milligrams per liter.
Min = Minimum.
NAWQC = National Ambient Water Quality Criteria.
OMZA = Outside mixing zone average.
PBT = Persistent, bioaccumulative, and toxic.
SRC = Site-related contaminant.
Bold = Chemical is a COPEC.

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