Ohio Water Quality Standards (OAC 3745-1) Overview

Bob Heitzman
Ohio EPA
Division of Surface Water

Water Quality Standards

- Beneficial use designations
  - Water body uses that are protected
- Water quality criteria and values
  - Numbers and narratives that protect water body uses
- Antidegradation
  - Restrictions on when water quality may be degraded
  - Special high quality waters

WQS-related Chapters
(not covered in this presentation)

- Implementation of WQS (3745-2)
  - Mixing zones
  - Wasteload allocation models
- Ohio NPDES Permits (3745-33)
  - Permit conditions
  - Variances

WQS apply to Surface Waters of the State

- All streams, lakes, reservoirs, ponds, marshes, wetlands or other waterways, except:
  - private waters that do not combine or effect a junction with natural surface or underground waters
  - waters defined as sewerage system, treatment works or disposal system in ORC 6111.01

How do I find applicable WQS for my water body of interest?

1. Determine applicable use designations
   - 3745-1-07 to -32
   - Alphabetical listing available
2. Determine applicable water quality criteria
   - 3745-1-07, -31, -32, -33, -34
   - Criteria summary tables available
3. Determine antidegradation category
   - 3745-1-05

1. Determining Applicable Use Designations

See handout – Summary of Ohio's Beneficial Use Designations (OAC 3745-1-07)

Use Designations

Defined in 3745-1-07; assigned in 3745-1-08 to -32

- Aquatic Life
  - Exceptional warmwater
  - Coldwater
  - Seasonal salmonid
  - Warmwater
  - Modified warmwater
  - Limited resource water
  - Limited warmwater
- Water Supply
  - Public
  - Agricultural
  - Industrial
- Recreation
  - Bathing waters
  - Primary contact
  - Secondary contact

Aquatic Life Uses

- Exceptional warmwater habitat
  - Exceptional or unusual biological communities
- Coldwater habitat
  - Trout stocking and management, or
  - Supports coldwater fish, organisms and plants on annual basis

Aquatic Life Uses continued

- Seasonal salmonid habitat
  - Large enough to support recreational fishing
  - Support passage of salmonids from October to May
  - Different use (EWH or WWH) applies rest of the year
  - Specific Lake Erie tribs.

Aquatic Life Uses continued

- Warmwater Habitat
  - Balanced warmwater biological communities
  - Most common aquatic life use
- Modified Warmwater Habitat
  - Incapable of WWH due to irretrievable modification of habitat

Aquatic Life Uses continued

- Limited Resource Water
  - No potential for any other aquatic life use
  - Natural background or irretrievable human-induced conditions
- Limited Warmwater Habitat
  - 1978 designation - no new LWH designations
  - Water bodies incapable of meeting specific WWH criteria
  - Only acid mine drainage LWHs remain

Water Supply Uses

- Public Water Supply
  - With conventional treatment, suitable for drinking
- Agricultural Water Supply
  - Suitable for irrigation and livestock watering without treatment
- Industrial Water Supply
  - Suitable for commercial and industrial uses, with or without treatment

Recreation Uses

- Bathing Waters
  - During recreation season, suitable for swimming with lifeguard and/or bathhouse
- Primary Contact Recreation
  - During recreation season, suitable for full-body contact recreation
- Secondary Contact Recreation
  - During recreation season, suitable for partial body contact recreation

Ohio Water Quality Standards
Administrative Code Chapter 3745-1

Water Body Use Designation

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Sorted alphabetically by water body name

Most Recent Revision:

4/11/02
(Covers rules effective 7/21/02)

Ohio Environmental Protection Agency
Division of Surface Water
Lazarus Government Center
122 South Front Street
Post Office Box 1049, Columbus, Ohio 43216-1049

WATER BODY	TRIBUTARY OF	RULE-PAGE
Hayden Run	Scioto River	09-31
Hayes Ditch	Big Walnut Creek	09-27
Hayward Run	Wolf Creek	24-04
Hazel Run	Upper North Fork Yellow Creek	13-21
Heads Branch	Rocky Fork	09-16
Healy Creek	East Branch Rocky River	20-02
Hebble Run	Mad River	21-09
Hecla Branch	Storms Creek	16-06
Hedden Ditch	Honey Creek	12-05
Hedgehog Creek	West Branch Wolf Creek	24-06
Hefflefinger Ditch	Mad River	21-12
Hefling Run	Brushy Fork	24-27
Heilman Ditch	Swan Creek	11-04
Heininger (Hemminger) Ditch	Ottawa Creek	11-12
Heisley Creek	Marsh Creek	10-02
Heldman Ditch	Hill Ditch	11-03
Hellbranch Run	Darby Creek	09-21
Heller Ditch	Little Painter Creek	21-13
Hen Run	Salt Run	18-06
Henderson Creek	Piney Fork	13-17
Henry Creek	Crane Creek	23-02
Hermann Ditch	Dry Fork	11-10
Herrod Creek	North Fork Paint Creek	09-14
Herrold Run	Federal Creek	08-03
Hewett Fork	Raccoon Creek	16-14
Hewitt Run	Black Fork	16-09
Hibbs Run	Thompson Run	24-11
Hickey Ditch	Brush Creek	11-05
Hickman Run	M.Fork of M. Branch Mill Creek	09-04
Hickory Branch	Wabash River	29-02
Hickory Creek (formerly Hickory Run)	Mahoning River	25-02
Hickson Run	Scioto River	09-10
Higbie-Redick Ditch	Ottawa Creek	11-12
Higgins Run	Rocky Fork	16-02
Hildebrand Run	Long Run	13-21
Hildebrand Run	Ohio River	16-10
Hill Ditch	Ottawa River	11-02
Hills Fork	East Fork Eagle Creek	17-08
Hines Run	Mahoning River	25-02
Hinkley Creek	West Branch Mahoning River	25-05
Hiram Tributary	Silver Creek	25-04
Hitchcock Run	Weaver Run	24-27
Hoagland Run	Killbuck Creek	24-38
Hoaglin Creek	West Branch Prairie Creek	11-09
Hocking River	Ohio River	08-02

Table 8-1. Use designations for water bodies in the Hocking river drainage basin.

Water Body Segment	Use Designations													Comments
		Aquatic Life Habitat						Water Supply			Recreation			
	SRW	WWH	EWH	MWH	SSH	CWH	LRW	PWS	AWS	IWS	BW	PCR	SCR	
Hocking river - Lithopolis rd. (RM 94.9) to Baldwin-Ewing run (RM 89.02)				+					+	+		+		EOLP ecoregion - channel modification
- bordering Rockbridge nature preserve	o	+							+	+		+		
- all other segments		+							+	+		+		
McGill run		*							*	*		*		
Ross run		*							*	*		*		
Fourmile creek	*		*						*	*		*		
East Fourmile creek	*		*						*	*		*		
Wolfpen creek		*							*	*		*		
Tar creek		*							*	*		*		
Skunk run		*							*	*		*		
Frost run		*							*	*		*		
Jordan run - headwaters to intersection of twp. rd. 153 and co. rd. 65 (RM 3.59)	*		+						*	*		*		
- within Marie J. Desonier nature preserve	o		+						*	*		*		
- all other segments			+						*	*		*		
Jordan run tributaries from the headwaters of Jordan run to the intersection of twp. rd. 153 and co. rd. 65 (RM 3.59)	*	*							*	*		*		
Lead run		*							*	*		*		
Rowell run		*							*	*		*		

Default Use Designations

(Water bodies not specifically listed in rule)

- EWH, PCR
  - Lakes and reservoirs (except upground storage reservoirs)
- WWH
  - Upground storage reservoirs
- PWS
  - Surface waters within 500 yards of surface water intake
  - Publicly owned lakes and reservoirs
  - Privately owned lakes and reservoirs used for drinking
  - Surface waters used as emergency water supplies
- BW
  - Surface waters used for swimming where lifeguard and/or bathhouse facilities present

2. Determining Applicable Water Quality Criteria

Water Quality Criteria

- Numerical
  - Aquatic life
    - (chemical and biological)
  - Wildlife
  - Aesthetics
  - Human health
  - Agricultural
  - Recreational
- Narrative
  - Free Froms
  - Criteria development procedures

Numerical Water Quality Criteria

See handout – Summary of Ohio's Numerical Water Quality Criteria

Aquatic Life Criteria

- Chemical
  - Inside and outside mixing zone maximum
    - Protect short-term exposures
  - Outside mixing zone average
    - Protect long-term exposure
- Biological
  - Outside mixing zone IBI, MIwb, ICI
    - Measure biological community health
    - Only for EWH, WWH & MWH

Table 7-1. Statewide water quality criteria for the protection of aquatic life.
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Chemical	Form[1]	Units[2]	IMZM[3]	OMZM[3]	OMZA[3]
Ammonia-N (WWH)	T	mg/l	--	Table 7-2	Table 7-5
Ammonia-N (EWH)	T	mg/l	--	Table 7-3	Table 7-6
Ammonia-N (MWH)	T	mg/l	--	Table 7-2	Table 7-7
Ammonia-N (SSH[4])	T	mg/l	--	Table 7-4	a
Ammonia-N (CWH)	T	mg/l	--	Table 7-4	Table 7-8
Ammonia-N (LRW)	T	mg/l	--	Table 7-2	--
Arsenic	D[6]	µg/l	680	340	150
Arsenic	TR[7]	µg/l	680	340	150
Cadmium[8]					
Chlorine					
(WWH, EWH, MWH, CWH)	R	µg/l	--	19	11
Chlorine (LRW)	R	µg/l	--	19	--
Chlorine (SSH[4])	R	µg/l	--	b	b
Chromium[8]					
Chromium VI	D	µg/l	31	16	11
Copper[8]					
Cyanide					
(Lake Erie drainage basin)	free	µg/l	44	22	5.2
(Ohio river drainage basin)					
(WWH, EWH, MWH)	free	µg/l	92	46	12
(LRW)	free	µg/l	92	46	--
(SSH[4], CWH)	free	µg/l	45	22	5.2
Dieldrin	T	µg/l	0.47	0.24	0.056
Dissolved oxygen[5] (WWH)	T	mg/l	--	4.0	5.0
Dissolved oxygen[5] (EWH)	T	mg/l	--	5.0	6.0
Dissolved oxygen[5] (MWH)	T	mg/l	--	3.0[c]	4.0
Dissolved oxygen[5] (SSH[4])	T	mg/l	--	a	a
Dissolved oxygen[5] (CWH)	T	mg/l	--	6.0	7.0
Dissolved oxygen[5] (LRW)	T	mg/l	--	2.0	3.0
Dissolved solids	T	mg/l	--	--	1500[d]

Table 7-5.
Warmwater habitat
outside mixing zone 30-day average total ammonia-nitrogen criteria (mg/l).

pH	6.5	6.7	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.8	9.0
Temp. (°C)																						
The following criteria apply during the months of December to February:																						
0-10	13.0	13.0	13.0	12.6	11.7	10.7	9.7	8.6	7.6	6.6	5.6	4.8	4.0	3.3	2.8	2.3	1.9	1.5	1.2	1.0	0.7	0.5
11	13.0	13.0	12.4	11.6	10.8	9.9	8.9	8.0	7.0	6.1	5.2	4.4	3.7	3.1	2.6	2.1	1.7	1.4	1.2	0.9	0.6	0.4
12	13.0	12.6	11.5	10.8	10.0	9.2	8.3	7.4	6.5	5.6	4.8	4.1	3.4	2.9	2.4	2.0	1.6	1.3	1.1	0.9	0.6	0.4
13	12.3	11.6	10.6	10.0	9.2	8.5	7.7	6.8	6.0	5.2	4.5	3.8	3.2	2.7	2.2	1.8	1.5	1.2	1.0	0.8	0.6	0.4
14	11.4	10.8	9.8	9.3	8.6	7.9	7.1	6.3	5.6	4.8	4.2	3.5	3.0	2.5	2.1	1.7	1.4	1.1	0.9	0.8	0.5	0.4
15	10.6	10.0	9.1	8.6	8.0	7.3	6.6	5.9	5.2	4.5	3.9	3.3	2.8	2.3	1.9	1.6	1.3	1.1	0.9	0.7	0.5	0.3
16	9.8	9.3	8.5	8.0	7.4	6.8	6.1	5.5	4.8	4.2	3.6	3.0	2.6	2.1	1.8	1.5	1.2	1.0	0.8	0.7	0.5	0.3
17	9.1	8.6	7.8	7.4	6.8	6.3	5.7	5.1	4.5	3.9	3.3	2.8	2.4	2.0	1.7	1.4	1.1	0.9	0.8	0.6	0.4	0.3
18	8.5	8.0	7.3	6.9	6.4	5.8	5.3	4.7	4.2	3.6	3.1	2.6	2.2	1.8	1.5	1.3	1.1	0.9	0.7	0.6	0.4	0.3
19	7.9	7.4	6.8	6.4	5.9	5.4	4.9	4.4	3.9	3.3	2.9	2.4	2.1	1.7	1.4	1.2	1.0	0.8	0.7	0.5	0.4	0.3
20	7.3	6.9	6.3	5.9	5.5	5.0	4.6	4.1	3.6	3.1	2.7	2.3	1.9	1.6	1.3	1.1	0.9	0.8	0.6	0.5	0.4	0.3
The following criteria apply during the months of March to November:																						
10	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.0	1.7	1.4	1.1	0.9	0.7	0.6	0.5	0.4	0.2	0.2
11	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.0	1.7	1.4	1.1	0.9	0.7	0.6	0.5	0.4	0.2	0.2
12	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.0	1.7	1.4	1.1	0.9	0.7	0.6	0.5	0.4	0.2	0.2
13	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	1.9	1.6	1.4	1.1	0.9	0.7	0.6	0.5	0.4	0.2	0.2
14	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	1.9	1.6	1.4	1.1	0.9	0.7	0.6	0.5	0.4	0.2	0.2
15	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	1.9	1.6	1.4	1.1	0.9	0.7	0.6	0.5	0.4	0.2	0.2
16	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	1.9	1.6	1.4	1.1	0.9	0.7	0.6	0.5	0.4	0.2	0.2
17	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	1.9	1.6	1.4	1.1	0.9	0.7	0.6	0.5	0.4	0.3	0.2
18	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	1.9	1.6	1.4	1.1	0.9	0.7	0.6	0.5	0.4	0.3	0.2
19	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	1.9	1.6	1.4	1.1	0.9	0.7	0.6	0.5	0.4	0.3	0.2
20	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	1.9	1.6	1.4	1.1	0.9	0.7	0.6	0.5	0.4	0.3	0.2
21	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	1.8	1.5	1.3	1.0	0.8	0.7	0.5	0.4	0.4	0.2	0.2
22	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.6	1.4	1.2	0.9	0.8	0.6	0.5	0.4	0.3	0.2	0.2
23	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.5	1.3	1.1	0.9	0.7	0.6	0.5	0.4	0.3	0.2	0.2
24	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.4	1.2	1.0	0.8	0.7	0.5	0.4	0.4	0.3	0.2	0.1
25	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.3	1.1	1.0	0.8	0.6	0.5	0.4	0.3	0.3	0.2	0.1
26	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.2	1.1	0.9	0.7	0.6	0.5	0.4	0.3	0.3	0.2	0.1
27	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.2	1.0	0.8	0.7	0.5	0.4	0.4	0.3	0.2	0.2	0.1
28	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.1	0.9	0.8	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.1
29	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.0	0.9	0.7	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.1
30	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	0.8	0.7	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.1

Table 7-9. Statewide water quality criteria for the protection of aquatic life for water hardness dependent criteria.
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Chemical	Form[1]	Units[2]	Equation	Criteria[6] 100	200	300	400
Nickel							
IMZM[3]	D[4]	µg/l	$e^{(0.846\ [\ln H] + 2.946)}$	940	1700	2400	3000
OMZM[3]	D[4]	µg/l	$e^{(0.846\ [\ln H] + 2.253)}$	470	840	1200	1500
OMZA[3]	D[4]	µg/l	$e^{(0.846\ [\ln H] + 0.0554)}$	52	93	130	170
Nickel							
IMZM[3]	TR[5]	µg/l	$e^{(0.846\ [\ln H] + 2.948)}$	940	1700	2400	3000
OMZM[3]	TR[5]	µg/l	$e^{(0.846\ [\ln H] + 2.255)}$	470	840	1200	1500
OMZA[3]	TR[5]	µg/l	$e^{(0.846\ [\ln H] + 0.0584)}$	52	94	130	170
Zinc							
IMZM[3]	D[4]	µg/l	$e^{(0.8473\ [\ln H] + 1.555)}$	230	420	590	760
OMZM[3]	D[4]	µg/l	$e^{(0.8473\ [\ln H] + 0.862)}$	120	210	300	380
OMZA[3]	D[4]	µg/l	$e^{(0.8473\ [\ln H] + 0.870)}$	120	210	300	380
Zinc							
IMZM[3]	TR[5]	µg/l	$e^{(0.8473\ [\ln H] + 1.577)}$	240	430	610	780
OMZM[3]	TR[5]	µg/l	$e^{(0.8473\ [\ln H] + 0.884)}$	120	220	300	390
OMZA[3]	TR[5]	µg/l	$e^{(0.8473\ [\ln H] + 0.884)}$	120	220	300	390

[1] D = dissolved; TR = total recoverable.
[2] µg/l = micrograms per liter (parts per billion).
[3] IMZM = inside mixing zone maximum; OMZM = outside mixing zone maximum; OMZA = outside mixing zone average.
[4] These criteria are implemented by multiplying them by a translator approved by the director pursuant to rule 3745-2-04 of the Administrative Code.
[5] These criteria apply in the absence of a translator approved by the director pursuant to rule 3745-2-04 of the Administrative Code.
[6] Numeric criteria are presented at example water hardnesses. The equations can be used to calculate numeric criteria at any water hardness up to 400 mg/l $CaCO_3$. "e" = the base e exponential function. "ln H" = the natural logarithm of the water hardness. The criteria at a water hardness of 400 mg/l $CaCO_3$ are used for water hardnesses above 400 mg/l $CaCO_3$.

Table 7-10. Statewide water quality criteria for the protection of aquatic life for water pH dependent criteria.

Chemical	Form[1]	Units[2]	Equation	Criteria[4] 6.5	7.5	8.0	9.0
Pentachlorophenol							
IMZM[3]	T	µg/l	$e^{(1.005\ [pH]\ -\ 4.176)}$	11	29	48	130
OMZM[3]	T	µg/l	$e^{(1.005\ [pH]\ -\ 4.869)}$	5.3	14	24	65
OMZA[3]	T	µg/l	$e^{(1.005\ [pH]\ -\ 5.134)}$	4.0	11	18	50

[1] T = total.
[2] µg/l = micrograms per liter (parts per billion).
[3] IMZM = inside mixing zone maximum; OMZM = outside mixing zone maximum; OMZA = outside mixing zone average.
[4] Numeric criteria are presented at example water pH. The equations can be used to calculate numeric criteria at any water pH between 6.5 and 9.0. "e" = the base e exponential function.

Table 7-14. Temperature criteria.

(A) General Ohio river basin - includes all waters of the state within the boundaries of the Ohio river basin, excluding the Ohio river and those water bodies or water body segments as designated in paragraphs (B) to (F) of this table. Shown as degrees fahrenheit and (celsius).

	Jan. 1-31	Feb. 1-29	Mar. 1-15	Mar. 16-31	Apr. 1-15	Apr. 16-30	May 1-15	May 16-31	June 1-15
Average:	47 (8.3)	47 (8.3)	51 (10.0)	54 (12.2)	59 (15.0)	65 (18.3)	67 (19.4)	70 (21.1)	74 (23.3)
Daily Maximum:	52 (11.1)	52 (11.1)	56 (13.3)	59 (15.0)	65 (18.3)	70 (21.1)	73 (22.8)	76 (24.4)	80 (26.7)
	June 16-30	July 1-31	Aug. 1-31	Sept. 1-15	Sept. 16-30	Oct. 1-15	Oct. 16-31	Nov. 1-30	Dec. 1-31
Average:	82 (27.8)	82 (27.8)	82 (27.8)	82 (27.8)	73 (22.8)	71 (21.7)	65 (18.3)	60 (15.6)	47 (8.3)
Daily Maximum:	85 (29.4)	85 (29.4)	85 (29.4)	85 (29.4)	78 (25.6)	76 (24.4)	70 (21.1)	65 (18.3)	52 (11.1)

(B) Lower great Miami river - Steele dam in Dayton (river mile 81.3) to the confluence with the Ohio river. Shown as degrees fahrenheit and (celsius).

	Jan. 1-31	Feb. 1-29	Mar. 1-15	Mar. 16-31	Apr. 1-15	Apr. 16-30	May 1-15	May 16-31	June 1-15
Average:	49 (9.4)	49 (9.4)	53 (11.9)	56 (13.3)	59 (15.0)	65 (18.3)	67 (19.4)	70 (21.1)	75 (23.9)
Daily Maximum:	54 (12.2)	54 (12.2)	58 (14.4)	61 (16.1)	68 (20.0)	74 (23.3)	77 (25.0)	79 (26.1)	83 (28.3)
	June 16-30	July 1-31	Aug. 1-31	Sept. 1-15	Sept. 16-30	Oct. 1-15	Oct. 16-31	Nov. 1-30	Dec. 1-31

Table 7-15 Page 1 of 2.

Biological criteria for warmwater, exceptional warmwater and modified warmwater habitats. Description and derivation of indices and ecoregions are contained in "Biological Criteria for the Protection of Aquatic Life: Volume II, Users Manual for Biological Field Assessment of Ohio Surface Waters" cited in paragraph (B) of rule 3745-1-03 of the Administrative Code. These criteria do not apply to the Ohio river, lakes or lake Erie river mouths.

Index Sampling site Ecoregion[1]	Modified warmwater habitat Channel Modif.	Mine Affected	Impounded	Warmwater Habitat	Exceptional Warmwater Habitat
(A) Index of biotic integrity (fish)					
(1) Wading sites[2]					
HELP	22	--	--	32	50
IP	24	--	--	40	50
EOLP	24	--	--	38	50
WAP	24	24	--	44	50
ECBP	24	--	--	40	50
(2) Boat sites[2]					
HELP	20	--	22	34	48
IP	24	--	30	38	48
EOLP	24	--	30	40	48
WAP	24	24	30	40	48
ECBP	24	--	30	42	48
(3) Headwater sites[3]					
HELP	20	--	--	28	50
IP	24	--	--	40	50
EOLP	24	--	--	40	50
WAP	24	24	--	44	50
ECBP	24	--	--	40	50
(B) Modified index of well-being (fish)[4]					
(1) Wading sites[2]					

Aesthetic Criteria

- Inside and outside mixing zone maximums
  - Protect against nuisance conditions
    - Algae, Foam, Oil & grease
- Drinking outside mixing zone average
  - Protects against bad taste and odor
    - Phosphorus, Phenolic chemicals

Table 7-11. Statewide water quality criteria for the protection against adverse aesthetic conditions.

Chemical	Form[1]	Units[2]	IMZM[3]	OMZM[3]	Drinking
2-Chlorophenol	T	µg/l	--	--	0.1[a]
2,4-Dichlorophenol	T	µg/l	--	--	0.3[a]
MBAS (foaming agents)	T	mg/l	--	0.50	--
Oil & grease	T	mg/l	--	10[b]	--
Phenol	T	µg/l	--	--	1.0[a]
Phosphorus	T	mg/l	c	--	c

[1] T = total.
[2] mg/l = milligrams per liter (parts per million); µg/l = micrograms per liter (parts per billion).
[3] IMZM = inside mixing zone maximum; OMZM = outside mixing zone maximum.
[a] This criterion is based on the protection against organoleptic (taste and/or odor) effects.
[b] Surface waters shall be free from floating oils and shall at no time produce a visible sheen or color film. Levels of oils or petrochemicals in the sediment or on the banks of a watercourse which cause deleterious effects to the biota will not be permitted.
[c] Total phosphorus as P shall be limited to the extent necessary to prevent nuisance growths of algae, weeds, and slimes that result in a violation of the water quality criteria set forth in paragraph (E) of rule 3745-1-04 of the Administrative Code or, for public water supplies, that result in taste or odor problems. In areas where such nuisance growths exist, phosphorus discharges from point sources determined significant by the director shall not exceed a daily average of one milligram per liter as total P, or such stricter requirements as may be imposed by the director in accordance with the international joint commission (United States-Canada agreement).

Agricultural Criteria

- Outside mixing zone average
  - Protects livestock watering and crop irrigation
- Metals, Fluoride, Nitrates & nitrites

Table 7-12. Statewide water quality criteria for the protection of agricultural uses.

Chemical	Form[1]	Units[2]	OMZA[3]
Arsenic	TR	µg/l	100
Beryllium	TR	µg/l	100
Cadmium	TR	µg/l	50
Total chromium	TR	µg/l	100
Copper	TR	µg/l	500
Fluoride	T	µg/l	2,000
Iron	TR	µg/l	5,000
Lead	TR	µg/l	100
Mercury	TR	µg/l	10
Nickel	TR	µg/l	200
Nitrates + nitrites	T	mg/l	100
Selenium	TR	µg/l	50
Zinc	TR	µg/l	25,000

[1] T = total; TR = total recoverable.
[2] mg/l = milligrams per liter (parts per million); µg/l = micrograms per liter (parts per billion).
[3] OMZA = outside mixing zone average.

Recreation Criteria

- Outside mixing zone maximum and average
  - Protect people from exposure to pathogens
- Criteria
  - Fecal coliform
  - E. coli

Table 7-13. Statewide numerical and narrative criteria for recreational use designations. For each designation at least one of the two bacteriological standards (fecal coliform or E. coli) must be met. These criteria apply outside the mixing zone.

Bathing waters

Fecal coliform - geometric mean fecal coliform content (either MPN or MF), based on not less than five samples within a thirty-day period, shall not exceed 200 per 100 ml and fecal coliform content (either MPN or MF) shall not exceed 400 per 100 ml in more than ten per cent of the samples taken during any thirty-day period.

E. coli - geometric mean E. coli content (either MPN or MF), based on not less than five samples within a thirty-day period, shall not exceed 126 per 100 ml and E. coli content (either MPN or MF) shall not exceed 235 per 100 ml in more than ten per cent of the samples taken during any thirty-day period.

Primary contact

Fecal coliform - geometric mean fecal coliform content (either MPN or MF), based on not less than five samples within a thirty-day period, shall not exceed 1,000 per 100 ml and fecal coliform content (either MPN or MF) shall not exceed 2,000 per 100 ml in more than ten per cent of the samples taken during any thirty-day period.

E. coli - geometric mean E. coli content (either MPN or MF), based on not less than five samples within a thirty-day period, shall not exceed 126 per 100 ml and E. coli content (either MPN or MF) shall not exceed 298 per 100 ml in more than ten per cent of the samples taken during any thirty-day period.

Secondary contact

Fecal coliform - shall not exceed 5,000 per 100 ml (either MPN or MF) in more than ten per cent of the samples taken during any thirty-day period.

E. coli - shall not exceed 576 per 100 ml in more than ten per cent of the samples taken during any thirty-day period.

Human Health Criteria

- Nondrinking OMZA
  - Protects people exposed via eating fish
- Drinking OMZA
  - Protects people exposed via drinking water and eating fish
- Lake Erie basin – GLI criteria
- Ohio River basin – national criteria (CWA & SDWA)

Wildlife Criteria

- Outside mixing zone average
  - Protect terrestrial wildlife against long-term exposures
- Lake Erie basin
  - DDT, Dioxin, Mercury, PCBs
- Ohio River basin
  - PCBs

Table 33-2. Lake Erie drainage basin water quality criteria for the protection of human health and wildlife.

Chemical	Form[1]	Units[2]	Human Health OMZA[3] Drinking	Human Health OMZA[3] Nondrinking	Wildlife OMZA[3]
Arsenic	TR	µg/l	10	--	--
Benzene[4]	T	µg/l	12	310	--
Chlordane[4]	T	ng/l	0.25	0.25	--
Chlorides	T	mg/l	250	--	--
Chlorobenzene	T	µg/l	470	3200	--
Cyanides	T	mg/l	0.60	48	--
DDT[4]	T	ng/l	0.15	0.15	0.011[a]
Dieldrin[4]	T	ng/l	0.0065	0.0065	--
2,4-Dimethylphenol	T	µg/l	450	8700	--
2,4-Dinitrophenol	T	µg/l	55	2800	--
Dissolved solids	T	mg/l	750/500[b]	--	--
Hexachlorobenzene[4]	T	ng/l	0.45	0.45	--
Hexachloroethane[4]	T	µg/l	5.3	6.7	--
Iron	S	µg/l	300	--	--
Lindane	T	µg/l	0.47	0.50	--
Mercury	TR	µg/l	0.0031	0.0031	0.0013
Methylene chloride[4]	T	µg/l	47	2600	--
Nitrate-N + Nitrite-N	T	mg/l	10	--	--
PCB[4]	T	ng/l	0.026	0.026	0.12
Sulfates	T	mg/l	250	--	--
2,3,7,8-TCDD[4]	T	pg/l	0.0086	0.0086	0.0031
Toluene	T	µg/l	5600	51000	--
Toxaphene[4]	T	ng/l	0.068	0.068	--
Trichloroethylene[4]	T	µg/l	29	370	--

[1] S = soluble; T = total; TR = total recoverable.
[2] mg/l = milligrams per liter (parts per million); µg/l = micrograms per liter (parts per billion); ng/l = nanograms per liter (parts per trillion); pg/l = picograms per liter (parts per quadrillion).

Do water quality criteria apply to all surface waters of the state?

Some criteria apply to all waters.

Some criteria apply only to waters with designated uses.

These Criteria Apply to All Surface Waters of the State

- Aquatic life: IMZM, OMZM, OMZA
  (Except that OMZA does not apply to LRW)
  - Aquatic life use determines which IMZMs, OMZMs and OMZAs apply (e.g., ammonia, dissolved oxygen)
- Wildlife: OMZA
- Aesthetics: IMZM, OMZA
- Human health: Nondrinking

These Criteria Apply Only to Waters With Designated Uses

- If designated EWH, WWH or MWH
  - Biological: IBI, MIwb, ICI
- If within 500 yards of drinking water intake (and all the Ohio River mainstem)
  - Aesthetics: Drinking
  - Human health: Drinking

These Criteria Apply Only to Waters With Designated Uses

- If designated AWS
  - Agricultural: OMZA
- If designated BW, PCR or SCR
  - Recreation: OMZM and OMZA (Except that OMZA does not apply to SCR)

Narrative Water Quality Criteria

Free Froms (3745-1-04)

- Apply to all surface waters, even mixing zones
- Narrative statements prohibiting nuisance and harmful conditions

Criteria Development Procedures

- Allow calculation of numbers for chemicals not in rule
  - Tier I criteria
  - Tier II values
- Aquatic life statewide (3745-1-36)
- Human health in Lake Erie basin (3745-1-38)
- Wildlife in Lake Erie basin (3745-1-39)

Criteria and Values

- Tier I criteria
  - Based on largest amount of data
  - Adopt in rule
- Tier II values
  - Based on intermediate amount of data
  - Not adopted in rule, but used just like Tier I criteria
- Screening values (Lake Erie basin only)
  - Based on least amount of data
  - Used for screening only

Criteria Summary Tables

- Basin-specific
  - Lake Erie drainage basin
  - Ohio River drainage basin
- Summarize
  - criteria adopted in rule and
  - criteria and values calculated from procedures
- Aquatic life
- Human health
- Aesthetics

Ohio River Basin Aquatic Life and Human Health Tier I Criteria and Tier II Values
contained in and developed pursuant to Chapter 3745-1 of the Ohio Administrative Code (OAC).
Table numbers within this table refer to Chapter 3745-1 of the OAC.
Ohio EPA, Division of Surface Water. **Effective 12/30/02**

		Aquatic Life (µg/l)			Human Health (µg/l)	
Chemical	Tier	IMZM	OMZM	OMZA	Drink	Nondrink
Acenaphthene	I	38	19	15	1,200	2,700
Acenaphthylene		ID	ID	ID	Not available	
Acetonitrile (Methyl cyanide)	II	210,000	100,000	12,000	Not available	
Acrolein					320	780
Acrylonitrile	II	1,300	650	78	0.59[c]	6.6[c]
Alachlor					2.0[a]	Not available
Aldicarb[1]					7.0[a]	Not available
Aldicarb sulfone					See Aldicarb	
Aldicarb sulfoxide					See Aldicarb	
Aldrin					0.0013[c]	0.0014[c]
2-Amino-4,6-dinitrotoluene	II	320	160	18	Not available	Not available
4-Amino-2,6-dinitrotoluene	II	200	98	11	Not available	Not available
Ammonia	I		Table 7-1		Not available	
Aniline	I,I,II	59	30	4.1	Not available	
Anthracene	II	0.35	0.18	0.020	9,600	110,000
Antimony	II	1,800	900	190	6.0[a]	4,300
Arsenic - Diss	I	680	340	150	NA	

Ohio River Basin Aquatic Life and Human Health Tier I Criteria and Tier II Values
contained in and developed pursuant to Chapter 3745-1 of the Ohio Administrative Code (OAC).
Table numbers within this table refer to Chapter 3745-1 of the OAC.
Ohio EPA, Division of Surface Water. **Effective 12/30/02**

	Aquatic Life (µg/l)				Human Health (µg/l)	
Chemical	Tier	IMZM	OMZM	OMZA	Drink	Nondrink
Vinyl chloride	II	17,000	8,400	930	2.0[a,c]	5,300[c]
Vydate	See Oxamyl					
Xylenes[g]	II	480	240	27	10,000[a]	Not available
Zinc - Diss	I	Table 7-9			NA	
Zinc - TR	I	Table 7-9			9,100	69,000
Zirconium		ID	ID	ID	Not available	

Other water quality criteria:
Ohio River criteria - Additional criteria applicable to the Ohio River are in OAC 3745-1-32. Those criteria supersede the criteria in this table, where applicable.
Agricultural Water Supply criteria - Table 7-12
Recreational (fecal coliform, E. coli) criteria - Table 7-13
Biological (IBI, Miwb, ICI) criteria - Table 7-15

Legend:
All criteria and values are expressed as total unless specified otherwise.
Diss = dissolved; TR = total recoverable; TRes = total residual.
Blank space = Criterion not calculated; contact the Standards & Technical Support section.
Not available = No criteria development procedures in OAC 3745-1.
ID = Insufficient data available to calculate criterion.
NA = Not applicable.
UR = Under review.
IMZM = Inside Mixing Zone Maximum.
OMZM = Outside Mixing Zone Maximum.

3. Determining Applicable Antidegradation Category

See handout – Summary of Ohio's Antidegradation Waterbody Classification System (OAC 3745-1-05)

Antidegradation – National program

- Tier I - existing uses must be protected
  - Whether designated in rule or not
- Tier II - if water quality is better than necessary to protect uses, water quality can be lowered only if a need is shown
- Tier III - Outstanding national resource waters
  - Water quality cannot be lowered

Antidegradation – Ohio program OAC 3745-1-05, Tables 5-4 to 5-7

- Includes all national program elements
- Includes more categories
  - Outstanding national resource waters - Table 5-7
  - Outstanding state waters - Tables 5-6 & 5-5
  - Superior high quality waters - Table 5-4, Lake Erie
  - State resource waters - 3745-1-08 to -30
  - General high quality waters - Default
  - Limited quality waters - 3745-1-08 to -30

Summary: How do I find applicable WQS for my water body of interest?

1. Determine applicable use designations
   - Check alphabetical listing
   - Use designations are defined in 3745-1-07
   - Use designations are assigned in 3745-1-08 to -32
   - Don't forget about default designations in 3745-1-07 (Slide # 17)

Summary: How do I find applicable WQS for my water body of interest?

2. Determine applicable water quality criteria
   - Check criteria summary tables
     - Ohio River drainage basin
     - Lake Erie drainage basin
   - Check end of table for references to other criteria
   - Determine which criteria apply to your water body (Slides # 38, 39 & 40)

Summary: How do I find applicable WQS for my water body of interest?

3. Determine antidegradation category
   - ONRW, OSW, SHQW
     - Look in 3745-1-05, Tables 5-4, 5-5, 5-6 & 5-7
   - LQW
     - Water bodies with aquatic life use designations of MWH, LRW & LWH
   - GHQW
     - All other water bodies

WQS for Wetlands

- Definitions (3745-1-50)
- Narrative criteria (3745-1-51)
  - Protect natural wetland conditions
- Numerical criteria (3745-1-52)
  - Same as WWH
- Use designation (3745-1-53)
  - Wetland
- Antidegradation (3745-1-54)
  - 3 wetland categories
  - Avoid, minimize, mitigate

For Additional Information

- Bob Heitzman 4-3075
- Chris Skalski 4-2144
- Dan Dudley 4-2876
- Water Quality Standards Web page:
  www.epa.state.oh.us/dsw/wqs