2013 Updates to Biological Criteria for the Protection of Aquatic Life: Volume II and Volume II Addendum. Users Manual for Biological Field Assessment of Ohio Surface Waters.

Division of Surface Water
Ecological Assessment Section
January 18, 2013

Volume II, P. 4-55, Modifies Table 4-5

- Metric 'Intolerant species' should read:

>100 sq. mi.	>5	3-5	<3
<100 sq. mi.	Varies with drainage area		

- Footnote *a* and *b* should be changed from <200 total fish to **<1000** total fish.

Volume II, P. 4-56, Modifies Table 4-6

- Metric 'Fish numbers' should read:

>450	200-450	**<200**

- Footnote *c* should have …(see Appendix B) changed to (see Table 4-10).

Volume II, P. 4-57, Modifies Table 4-7

- Footnote *b* and *c* should be changed from <200 total fish to **<1000** total fish.
- Footnote *d* should have …(see Appendix B) changed to (see **Table 4-10**).

Volume II, P. 4-62, Modifies Table 4-10

- Refer to new table included in the following pages of updates.

Volume II, P. 4-65, Modifies Table 4-11

- Species excluded from relative numbers (N) and relative weights (B) also includes **hybrids** and **exotics**.
- Relative weights (B) is measured in **kilograms**.
- H(wt.) …based on numbers should be changed to **based on weight**.

Volume II, P. 8-13, Modifies Table 8-3

- Refer to new table of narrative ranges included in the following pages of updates.

Volume II, P. 4-62, Replaces Table 4-10.

Table 4-10. Guidelines used by the Ohio EPA for making "low-end" scoring adjustments to IBI proportion metrics when samples include fewer than 200 individual fish CPUE (all individuals including tolerants; updated from Ohio EPA 1987b, Table 4-10). Number of individuals means the number of fish per 0.3 km for wading and headwater sites and per 1.0 km for boat sites. Young-of-year (YOY) fish may be collected and noted separately on the fish data sheet to aid in data analysis and effects on metric scoring.

IBI Metric	Narrative Guidelines for Scoring Modifications
% Omnivores	For wading and boat sites a metric score of "1" is assigned if the number of individuals is <50. For numbers between 50-200 a metric score of "1" may be assigned when: ● species considered as generalist feeders predominate (*i.e.* comprise >50% by numbers in aggregate); this includes creek chub, blacknose dace, and green sunfish. ● if a single species comprises >50% of the sample this metric can be scored on a recalculated % omnivores minus the predominant species. For headwater sites <8 sq. mi. drainage area, the number of individuals criterion decreases to <25
% Insectivores	For wading and boat sites a metric score of "1" is assigned if the total number of individuals is <50 (<25 for headwater sites <8 sq. mi. drainage area). For numbers between 50-200 a metric score of "1" may be assigned when: ● the sample is predominated (>50% of the sample) either individually or in aggregate by striped shiner, common shiner, spotfin shiner, green sunfish, blackstripe topminnow, or juveniles of any insectivorous species which can function as omnivores under certain conditions (Angermier 1985).
% Top Carnivores	For wading and boat sites a metric score of "1" is assigned if the number of individuals is <50 (<25 for headwater sites at <8 sq. mi. drainage area). For boat sites a metric score of "1" is assigned for samples with 50-200 individuals if the sample is exclusively predominated by juvenile top carnivores. For wading sites a metric score of "1" may be assigned when: ● the top carnivores in the sample are predominated by redfin pickerel and/or juvenile largemouth bass.
% Simple Lithophils	For wading and boat sites a metric score of "1" is assigned if the number of individuals is <50 (<25 for headwater sites at <8 sq. mi. drainage area). This is rarely contrary to the score prior to the adjustment.
% DELT Anomalies	For wading and boat sites a metric score of "1" is assigned if the number of individuals is <50 (<25 for headwater sites at <8 sq. mi. drainage area). For numbers between 50-200 a metric score of "1" may be assigned when: ● circumstances suggest that the frequency of DELTs is underestimated or not representative due to low numbers; this may happen when the sample is predominated by juvenile fish which have not yet had time to "accrue" anomalies.
% Pioneering Species	For headwater sites a metric score of "1" is assigned if the number of individuals is <50 (<25 for headwater sites at <8 sq. mi. drainage area). For numbers between 50-200 a metric score of "1" may be assigned when: ● the sample is predominated (>50% of the sample) by a single species; the metric score is based on the proportion of pioneering species less this single predominant species.
% Round-bodied Suckers	No adjustments are necessary for this metric.
% Tolerants	For wading and boat sites a metric score of "1" is assigned if the number of individuals is <50 (<25 for headwater sites at <8 sq. mi. drainage area).

Code	Name		Feed Guild	Toler-ance	IBI Group	Breed Guild	Declin Sp.	ODNR Status
	PETROMYZONDIDAE							
01-000	LAMPREY SP.					N		
01-001	SILVER LAMPREY	*Ichthyomyzon unicuspis*	P			N	D	
01-002	NORTH BROOK LAMPREY	*Ichthyomyzon fossor*	F	R		N	D	E
01-003	OHIO LAMPREY	*Ichthyomyzon bdellium*	P	S		N		E
01-004	MNT. BROOK LAMPREY	*Ichthyomyzon greeleyi*	F	S		N		E
01-005	SEA LAMPREY	*Petromyzon marinus*	P		E	N		
01-006	LEAST BROOK LAMPREY	*Lampetra aepyptera*	F			N	D	
01-007	AMER BROOK LAMPREY	*Lampetra appendix*	F	R		N		
01-008	CHESTNUT LAMPREY	*Ichthyomyzon castaneus*	P	P		N		
	POLYODONTIDAE							
04-001	PADDLEFISH	*Polyodon spathula*	F	S		S		T
	ACIPENSERIDAE							
08-001	LAKE STURGEON	*Acipenser fulvescens*	V			S		E
08-002	SHOVELNOSE STURGEON	*S. platorynchus*	I			S		E
	LEPISOSTEIDAE							
10-001	ALLIGATOR GAR	*Atractosteus spatula*	P			M		X
10-002	SHORTNOSE GAR	*Lepisosteus platostomus*	P			M		E
10-003	SPOTTED GAR	*Lepisosteus oculatus*	P			M		E
10-004	LONGNOSE GAR	*Lepisosteus osseus*	P			M		
	AMIIDAE							
15-001	BOWFIN	*Amia calva*	P			C		
	HIODONTIDAE							
18-001	GOLDEYE	*Hiodon alosoides*	I	R		M	D	E
18-002	MOONEYE	*Hiodon tergisus*	I	R		M	D	
	CLUPEIDAE							
20-001	SKIPJACK HERRING	*Alosa chrysochloris*	P			M		
20-002	ALEWIFE	*Alosa pseudoharengus*			E	M		
20-003	GIZZARD SHAD	*Dorosoma cepedianum*	O			M		
20-004	THREADFIN SHAD	*Dorosoma petenense*	O			M		
	SALMONIDAE							
25-001	BROWN TROUT	*Salmo trutta*			E	N		
25-002	RAINBOW TROUT	*Oncorhynchus mykiss*			E	N		
25-003	BROOK TROUT	*Salvelinus fontinalis*				N	D	T
25-004	LAKE TROUT	*Salvelinus namaycush*	P		F	N		S
25-005	COHO SALMON	*Oncorhynchus kisutch*			E	N		
25-006	CHINOOK SALMON	*Oncorhynchus tshawytscha*			E	N		
25-007	CISCO	*Coregonus artedi*				M		E
25-008	LAKE WHITEFISH	*Coregonus clupeaformis*	V			M		S
25-009	PINK SALMON	*Oncorhynchus gorbuscha*			E	N		

Code	Name		Feed Guild	Toler-ance	IBI Group	Breed Guild	Declin Sp.	ODNR Status
	OSMERIDAE							
30-001	RAINBOW SMELT	*Osmerus mordax*				M		
	UMBRIDAE							
34-001	CENTRAL MUDMINNOW	*Umbra limi*	I	T		C		
	ESOCIDAE							
37-001	REDFIN PICKEREL	*Esox americanus*	P	P		M		
37-002	CHAIN PICKEREL	*Esox niger*	P		E	M		
37-003	NORTHERN PIKE	*Esox lucius*	P		F	M		
37-004	MUSKELLUNGE	*Esox masquinongy*	P		F	M	D	S
37-005	N.PIKE X MUSKELLUNGE	*HYBRID*	P		E			
37-006	GRASS P. X CHAIN P.	*HYBRID*	P		F			
	CATOSTOMIDAE							
40-001	BLUE SUCKER	*Cycleptus elongatus*	I	R	R	S		E
40-002	BIGMOUTH BUFFALO	*Ictiobus cyprinellus*	I		C	M		
40-003	BLACK BUFFALO	*Ictiobus niger*	I		C	M		
40-004	SMALLMOUTH BUFFALO	*Ictiobus bubalus*	I		C	M		
40-005	QUILLBACK	*Carpiodes cyprinus*	O		C	M		
40-006	RIVER CARPSUCKER	*Carpiodes carpio*	O		C	M		
40-007	HIGHFIN CARPSUCKER	*Carpiodes velifer*	O		C	M		
40-008	SILVER REDHORSE	*Moxostoma anisurum*	I	M	R	S		
40-009	BLACK REDHORSE	*Moxostoma duquesnei*	I	I	R	S		
40-010	GOLDEN REDHORSE	*Moxostoma erythrurum*	I	M	R	S		
40-011	SHORTHEAD REDHORSE	*Moxostoma macrolepidotum*	I	M	R	S		
40-012	GREATER REDHORSE	*Moxostoma valenciennesi*	I	R	R	S		T
40-013	RIVER REDHORSE	*Moxostoma carinatum*	I	I	R	S		S
40-014	HARELIP SUCKER	*Moxastoma lacerum*		S	R	S		N
40-015	NORTHERN HOG SUCKER	*Hypentelium nigricans*	I	M	R	S		
40-016	WHITE SUCKER	*Catostomus commersonii*	O	T	W	S		
40-017	LONGNOSE SUCKER	*Catostomus catostomus*	I		R	S		E
40-018	SPOTTED SUCKER	*Minytrema melanops*	I		R	S		
40-019	LAKE CHUBSUCKER	*Erimyzon sucetta*	I		R	M	D	T
40-020	CREEK CHUBSUCKER	*Erimyzon oblongus*	I		R	M	D	
40-021	RIVER CS X QUILLBACK	*HYBRID*	O		C	M		
40-022	BM BUFFALO X SM BUFFALO	*HYBRID*	I		C	M		
40-023	SMALLMOUTH REDHORSE	*Moxostoma breviceps*	I	M	R	S		
	CYPRINIDAE							
43-001	COMMON CARP	*Cyprinus carpio*	O	T	G	M		
43-002	GOLDFISH	*Carassius auratus*	O	T	G	M		
43-003	GOLDEN SHINER	*Notemigonus crysoleucas*	I	T	N	M		
43-004	HORNYHEAD CHUB	*Nocomis biguttatus*	I	I	N	N	D	
43-005	RIVER CHUB	*Nocomis micropogon*	I	I	N	N	D	

Code	Name		Feed Guild	Toler-ance	IBI Group	Breed Guild	Declin Sp.	ODNR Status
43-006	SILVER CHUB	*Macrhybopsis storeriana*	I		N	M		
43-007	BIGEYE CHUB	*Hybopsis amblops*	I	I	N	S	D	
43-008	STREAMLINE CHUB	*Erimystax dissimilis*	I	R	N	S	D	
43-009	GRAVEL CHUB	*Erimystax x-punctatus*	I	M	N	S		
43-010	SHOAL CHUB	*Macrhybopsis hyostoma*	I	S	N	M		E
43-011	WESTERN BLACKNOSE DACE	*Rhinichthys obtusus*	G	T	N	S		
43-012	LONGNOSE DACE	*Rhinichthys cataractae*	I	R	N	S		
43-013	CREEK CHUB	*Semotilus atromaculatus*	G	T	N	N		
43-014	TONGUETIED MINNOW	*Exoglossum laurae*	I	S	N	N	D	T
43-015	SUCKERMOUTH MINNOW	*Phenacobius mirabilis*	I		N	S		
43-016	SOUTH. REDBELLY DACE	*Phoxinus erythrogaster*	H		N	S	D	
43-017	REDSIDE DACE	*Clinostomus elongatus*	I	I	N	S	D	
43-018	ROSYSIDE DACE	*Clinostomus funduloides*	I	S	N	S		T
43-019	PUGNOSE MINNOW	*Opsopoeodus emiliae*	I	R	N	M	D	E
43-020	EMERALD SHINER	*Notropis atherinoides*	I		N	M		
43-021	SILVER SHINER	*Notropis photogenis*	I	I	N	S		
43-022	ROSYFACE SHINER	*Notropis rubellus*	I	I	N	S	D	
43-023	REDFIN SHINER	*Lythrurus umbratilis*	I		N	N		
43-024	SCARLET SHINER	*Lythrurus fasciolaris*	I	M	N	S		
43-025	STRIPED SHINER	*Luxilus chrysocephalus*	I		N	S		
43-026	COMMON SHINER	*Luxilus cornutus*	I		N	S		
43-027	RIVER SHINER	*Notropis blennius*	I		N	S		
43-028	SPOTTAIL SHINER	*Notropis hudsonius*	I	P	N	M		
43-029	BLACKCHIN SHINER	*Notropis heterodon*	I	S	N	M		E
43-030	BIGEYE SHINER	*Notropis boops*	I	R	N	S	D	T
43-031	STEELCOLOR SHINER	*Cyprinella whipplei*	I	P	N	M		
43-032	SPOTFIN SHINER	*Cyprinella spiloptera*	I		N	M		
43-033	BIGMOUTH SHINER	*Notropis dorsalis*	I		N	M		T
43-034	SAND SHINER	*Notropis stramineus*	I	M	N	M		
43-035	MIMIC SHINER	*Notropis volucellus*	I	I	N	M	D	
43-036	GHOST SHINER	*Notropis buchanani*	I		N	M		
43-037	BLACKNOSE SHINER	*Notropis heterolepis*	I	R	N	M	D	E
43-038	PUGNOSE SHINER	*Notropis anogenus*	I	S	N	M		X
43-039	SILVERJAW MINNOW	*Notropis buccatus*	I		N	M		
43-040	MISS. SILVERY MINNOW	*Hybognathus nuchalis*	H		N	M		E
43-041	BULLHEAD MINNOW	*Pimephales vigilax*	O		N	C		
43-042	FATHEAD MINNOW	*Pimephales promelas*	O	T	N	C		
43-043	BLUNTNOSE MINNOW	*Pimephales notatus*	O	T	N	C		
43-044	CENTRAL STONEROLLER	*Campostoma anomalum*	H		N	N		
43-044	CENTRAL STONEROLLER	*Campostoma anomalum*	H		N	N		
43-045	COMMON CARP X GOLDFISH	*HYBRID*	O	T	G			

Code	Name		Feed Guild	Toler-ance	IBI Group	Breed Guild	Declin Sp.	ODNR Status
43-046	POPEYE SHINER	*Notropis ariommus*	I	S	N	S	D	E
43-047	GRASS CARP	*Ctenopharyngodon idella*			E	M		
43-048	RED SHINER	*Cyprinella lutrensis*	I		E	N		
43-049	COMMON SH X ROSYFACE SH	*HYBRID*	I					
43-050	STRIPED SH X RIVER CHUB	*HYBRID*	I					
43-051	RIVER CHUB X STONEROLLER	*HYBRID*						
43-052	STRIPED SH X ROSYFACE SH	*HYBRID*	I					
43-053	CREEK CHUB X REDSIDE DACE	*HYBRID*	I					
43-054	STRIPED SH X CREEK CHUB	*HYBRID*	I					
43-055	COMMON SH X RIVER CHUB	*HYBRID*	I					
43-056	B.N. DACE X STONEROLLER	*HYBRID*						
43-057	STRIPED SH X STONEROLLER	*HYBRID*						
43-058	COMMON SH X STONEROLLER	*HYBRID*						
43-059	STR SHIN X HORNYHEAD CH	*HYBRID*	I					
43-060	STRIPED SH X COMMON SH	*HYBRID*	I					
43-061	STRIPED SH X ROSEFIN SH	*HYBRID*	I					
43-062	CR CHUB X S. REDBELLY D	*HYBRID*						
43-063	CHANNEL SHINER	*Notropis wickliffi*	I	I	N	M		
43-064	STRIPED SH X SILVER SH	*HYBRID*	I					
43-065	STRIPED SH X S REDBELLY D	*HYBRID*						
43-066	ROSYFACE SH X SILVER SH	*HYBRID*	I	I				
43-067	SAND SH X SILVER SH	*HYBRID*	I					
43-068	STRIPED SH X REDFIN SH	*HYBRID*	I					
43-069	REDSIDE DACE X COMMON SH	*HYBRID*	I					
43-070	S. REDBELLY D X COMMON SH	*HYBRID*	I					
43-071	WHITETAIL SHINER	*Cyprinella galactura*			N			
43-072	COMMON SH X SILVER SH	*HYBRID*	I			S		
43-073	REDFIN SH X ROSEFIN SH	*HYBRID*	I					
43-074	COMMON SH X CREEK CHUB	*HYBRID*						
43-075	COMMON SH X FATHEAD M	*HYBRID*						
43-076	PALLID SHINER	*Notropis amnis*	I	R	N	S		
43-077	STONEROLLER X SRBD	*HYBRID*	H		N			
43-078	CREEK CHUB X LONGNOSE	*HYBRID*			N			
43-079	SILVER CARP	*Hypophthalmichthys molitrix*	O		G			
43-080	REDSIDE D X STRIPED SH	*HYBRID*	I			S		
43-081	BIGHEAD CARP	*Hypophthalmichthys nobilis*	O		G			
43-999	HYBRID X MINNOW	*HYBRID*						
	ICTALURIDAE							
47-001	BLUE CATFISH	*Ictalurus furcatus*	C		F	C		E
47-002	CHANNEL CATFISH	*Ictalurus punctatus*			F	C		
47-003	WHITE CATFISH	*Ameiurus catus*	I		E	C		

Code	Name		Feed Guild	Toler-ance	IBI Group	Breed Guild	Declin Sp.	ODNR Status
47-004	YELLOW BULLHEAD	*Ameiurus natalis*	I	T		C		
47-005	BROWN BULLHEAD	*Ameiurus nebulosus*	I	T		C		
47-006	BLACK BULLHEAD	*Ameiurus melas*	I	P		C		
47-007	FLATHEAD CATFISH	*Pylodictis olivaris*	P		F	C		
47-008	STONECAT MADTOM	*Noturus flavus*	I	I		C		
47-009	MOUNTAIN MADTOM	*Noturus eleutherus*	I	R		C	D	E
47-010	NORTHERN MADTOM	*Noturus stigmosus*	I	R		C	D	E
47-011	SCIOTO MADTOM	*Noturus trautmani*	I	S		C		E
47-012	BRINDLED MADTOM	*Noturus miurus*	I	I		C	D	
47-013	TADPOLE MADTOM	*Noturus gyrinus*	I			C		
47-014	YELLOW BH X BROWN BH	*HYBRID*	I	T		C		
47-015	BROWN BH X BLACK BH	*HYBRID*	I			C		
47-016	FRECKLED MADTOM	*Noturus nocturnus*	I			C		
	ANGUILLIDAE							
50-001	AMERICAN EEL	*Anguilla rostrata*	C			M		T
	CYPRINODONTIDAE							
54-000	WESTERN BANDED KILLIFISH	*Fundulus diaphanus menona*	I	S		M	D	E
54-001	EASTERN BANDED KILLIFISH	*Fundulus diaphanus d.*	I	T	E	M		
54-002	BLACKSTRIPE TOPMINNOW	*Fundulus notatus*	I			M		
54-003	NORTHERN STUDFISH	*Fundulus catenatus*	I			M		
	POECILLIDAE							
57-001	WESTERN MOSQUITOFISH	*Gambusia affinis*	I		E	N		
	GADIDAE							
60-001	BURBOT	*Lota lota*				S		S
	PERCOPSIDAE							
63-001	TROUT-PERCH	*Percopsis omiscomaycus*	I			M		
	APHREDODERIDAE							
68-001	PIRATE PERCH	*Aphredoderus sayanus*	I			C		E
	ATHERINIDAE							
70-001	BROOK SILVERSIDE	*Labidesthes sicculus*	I	M		M		
	PERCICHTHYIDAE							
74-001	WHITE BASS	*Morone chrysops*	P		F	M		
74-002	STRIPED BASS	*Morone saxatalis*	P		E	M		
74-003	WHITE PERCH	*Morone americana*			E	M		
74-004	WH. BASS X WH. PERCH	*HYBRID*						
74-005	STR. BASS X WH. BASS	*HYBRID*			E			
74-006	YELLOW BASS	*Morone mississippiensis*	P	P		M		
74-007	MORONE SP.					M		
	CENTRARCHIDAE							
77-000	CENTRARCHIDAE SP.							
77-001	WHITE CRAPPIE	*Pomoxis annularis*	I		S	C		

Code	Name		Feed Guild	Toler-ance	IBI Group	Breed Guild	Declin Sp.	ODNR Status
77-002	BLACK CRAPPIE	*Pomoxis nigromaculatus*	I		S	C		
77-003	ROCK BASS	*Ambloplites rupestris*	C		S	C		
77-004	SMALLMOUTH BASS	*Micropterus dolomieux*	C	M	F	C		
77-005	SPOTTED BASS	*Micropterus punctulatus*	C		F	C		
77-006	LARGEMOUTH BASS	*Micropterus salmoides*	C		F	C		
77-007	WARMOUTH SUNFISH	*Lepomis gulosus*	C		S	C		
77-008	GREEN SUNFISH	*Lepomis cyanellus*	I	T	S	C		
77-009	BLUEGILL SUNFISH	*Lepomis macrochirus*	I	P	S	C		
77-010	ORANGESPOTTED SUNFISH	*Lepomis humilis*	I		S	C		
77-011	LONGEAR SUNFISH	*Lepomis megalotis*	I	M	S	C		
77-012	REDEAR SUNFISH	*Lepomis microlophus*	I		E	C		
77-013	PUMPKINSEED SUNFISH	*Lepomis gibbosus*	I	P	S	C		
77-014	BLUEGILL X PUMPKINSEED	*HYBRID*						
77-015	GREEN SF X BLUEGILL SF	*HYBRID*						
77-016	GREEN SF X PUMPKINSEED	*HYBRID*						
77-017	LONGEAR SF X BLUEGILL SF	*HYBRID*						
77-018	BLUEGILL X ORANGESPOT	*HYBRID*						
77-019	GREEN SF X ORANGESPOT SF	*HYBRID*						
77-020	PUMPKINSEED X LONGEAR SF	*HYBRID*						
77-021	GREEN SF X LONGEAR SF	*HYBRID*						
77-022	ORANGESPOT SF X	*HYBRID*						
77-023	LONGEAR X ORANGESPOT	*HYBRID*						
77-024	GREEN SF X WARMOUTH SF	*HYBRID*						
77-025	WARMOUTH X PUMPINSEED	*HYBRID*						
77-026	LARGEMOUTH X SPOTTED	*HYBRID*	C		F	C		
77-027	SPOTTED SUNFISH	*Lepomis punctatus*			S	C		
77-028	BLUEGILL SF X REDEAR SF	*HYBRID*	I			C		
77-029	BLUEGILL SF X WARMOUTH SF	*HYBRID*			S	C		
77-998	GREEN SF X HYBRID	*HYBRID*						
77-999	HYBRID X SUNFISH	*HYBRID*						
	CICHLIDAE							
79-001	OSCAR	*Astronotus ocellatus*	I			C		
79-002	AFRICAN JEWELFISH	*Hemichromis letourneuxi*	I			C		
79-003	JACK DEMPSEY	*Cichlasoma octofasciatum*	I			C		
	PERCIDAE							
80-001	SAUGER	*Sander canadensis*	P		F	S		
80-002	WALLEYE	*Sander vitreus*	P		F	S		
80-003	YELLOW PERCH	*Perca flavescens*				M		
80-004	DUSKY DARTER	*Percina sciera*	I	M	D	S		
80-005	BLACKSIDE DARTER	*Percina maculata*	I		D	S		
80-006	LONGHEAD DARTER	*Percina macrocephata*	I	S	D	S		X

Code	Name		Feed Guild	Toler-ance	IBI Group	Breed Guild	Declin Sp.	ODNR Status
80-007	SLENDERHEAD DARTER	*Percina phoxocephala*	I	R	D	S		
80-008	RIVER DARTER	*Percina shumardi*	I		D	S	D	T
80-009	CHANNEL DARTER	*Percina copelandi*	I	S	D	S		T
80-010	GILT DARTER	*Percina evides*	I	S	D	S		X
80-011	LOGPERCH	*Percina caprodes*	I	M	D	S		
80-011	LOGPERCH	*Percina caprodes*	I	M	D	S		
80-012	CRYSTAL DARTER	*Crystallaria asprella*	I	S	D	S		X
80-013	EASTERN SAND DARTER	*Ammocrypta pellucida*	I	R	D	S	D	S
80-014	JOHNNY DARTER	*Etheostoma nigrum*	I		D	C		
80-014	JOHNNY DARTER	*Etheostoma nigrum*	I		D	C		
80-015	GREENSIDE DARTER	*Etheostoma blennioides*	I	M	D	S		
80-015	GREENSIDE DARTER	*Etheostoma blennioides*	I	M	D	S		
80-016	BANDED DARTER	*Etheostoma zonale*	I	I	D	S		
80-017	VARIEGATE DARTER	*Etheostoma variatum*	I	I	D	S	D	
80-018	SPOTTED DARTER	*Etheostoma maculatum*	I	R	D	S		E
80-019	BLUEBREAST DARTER	*Etheostoma camurum*	I	R	D	S	D	T
80-020	TIPPECANOE DARTER	*Etheostoma tippencanoe*	I	R	D	S		T
80-021	IOWA DARTER	*Etheostoma exile*	I		D	M		S
80-022	RAINBOW DARTER	*Etheostoma caeruleum*	I	M	D	S		
80-023	ORANGETHROAT DARTER	*Etheostoma spectabile*	I		D	S		
80-024	FANTAIL DARTER	*Etheostoma flabellare*	I		D	C		
80-025	LEAST DARTER	*Etheostoma microperca*	I		D	N	D	S
80-026	SAUGER X WALLEYE	*HYBRID*	P		E			
80-027	RAINBOW X ORANGETHROAT	*HYBRID*	I		D	S		
80-028	MUD DARTER	*Etheostoma asprigene*	V	P	D	M		
80-999	HYBRID X DARTER	*HYBRID*	I		D	S		
	SCIAENIDAE							
85-001	FRESHWATER DRUM	*Aplodinotus grunniens*		P		M		
	GOBIIDAE							
87-001	ROUND GOBY	*Neogobius melanostomus*						
87-002	TUBENOSE GOBY	*Proterorhinus marmoratus*						
	COTTIDAE							
90-001	SPOONHEAD SCULPIN	*Cottus ricei*				C		S
90-002	MOTTLED SCULPIN	*Cottus bairdii*	I			C		
90-002	MOTTLED SCULPIN	*Cottus bairdi*	I			C		
90-003	SLIMY SCULPIN	*Cottus cognatus*						
90-004	DEEPWATER SCULPIN	*Myoxocephalus thompsonii*						
	GASTEROSTEIDAE							
95-001	BROOK STICKLEBACK	*Culaea inconstans*	I			C		
95-002	THREE-SPINE STICKLEBACK	*Gasterosteus aculeatus*						

Code	Name	Feed Guild	Toler-ance	IBI Group	Breed Guild	Declin Sp.	ODNR Status
99-001	Unidentified (Non-EPA)						
99-040	UNSPECIFIED SUCKER						
99-043	UNSPECIFIED MINNOW						
99-047	UNSPECIFIED CATFISH						
99-077	UNSPECIFIED CENTRARCHID						
99-078	UNSPECIFIED BASS						
99-079	UNSPECIFIED SUNFISH						
99-998	MULTIPLE SPECIES						
99-999	NO FISH						

The preceding common and scientific names are updated based on American Fisheries Society Special Publication 29, Common and Scientific Names of Fishes from the United States, Canada, and Mexico, Sixth Edition, 2004.

Feeding Guild Codes: P-Piscivore; F-Filter Feeder; I-Insectivore; O-Omnivor; V-Invertivore; Generalized Insectivore; H - Herbivore; C - Carnivore (Fish, Large Invertebrate).

Tolerance Codes: I - Intolerant (also (R,S) , M - Moderately Intolerant; No Code - Intermediate Tolerance; P - Moderately Tolerant; T - Tolerant. ["Sensitive" species are Intolerants and Moderately Intolerant].

IBI Group: E - Exotic; F - Sport Fish; R - Round Bodied Sucker; C - Deep Bodied Sucker; W - White Sucker; N - Minnow; S - Sunfish; D - Darter; G - Carp/Goldfish.

Breeding Guild: N - Complex, No Parental Care; S - Simple Lithophil; M - Simple, Misc; C- Complex, Parental Care.

11/08/2006

Volume II, P. 8-6, Replaces Table 8-2 (In Part). Fish cold water species list.

American brook lamprey (*Lampetra appendix*)
Northern brook lamprey (*Ichthyomyzon fossor*)
Brook trout (*Salvelinus fontinalis*)
Longnose dace (*Rhinichthys cataractae*)
Redside dace (*Clinostomus elongatus*)
Southern redbelly dace (*Phoxinus erythrogaster*)
Western tonguetied minnow (*Exoglossum laurae*)
Brook stickleback (*Culaea inconstans*)
Central mottled sculpin (*Cottus bairdi*)
Central mudminnow (*Umbra limi*)

Definition

Cold water fish are fish that are either stenothermal with upper incipient lethal temperatures in the range of 20-24°C, or that show a strong affinity for cold water as empirically demonstrated by having a weighted average temperature of less than 20.5^{o}C and a greater than 50% chance of co-occurrence with one or more cold water macroinvertebrate taxa at a given sampling location during the summer collection period (June 15 to September 30). Percentile breakdowns for each cold water fish and literature references relevant to the assessment process noted above are available upon request from the Ohio EPA.

Volume II, P. 5-3, Modifies Table 5-1. Modifications to ICI metric scoring.

Scoring of all metrics varies with drainage area at the sampling site location. Refer to the plots in the Addendum to Volume II (September 1989) for updated scoring calibrations for each metric.

Add as footnote 1: For sampling locations with drainage areas less than 10 mi^2, scoring of all ten metrics defaults to a 10 mi^2 drainage area.

Add as footnote 2: In cases where conditions are so severely degraded that no or only a few organisms (<50 individuals) are collected and where the percentages of proportional metrics may be skewed considerably due to these low numbers, scoring of metrics 5-9 defaults to a zero score rather than actual scored values. Such adjustments are needed since a low number of organisms renders the proportional relationships between macroinvertebrate groups relatively meaningless.

Volume II, P. 5-16, Modifies Table 5-2. Modifications to the list of pollution tolerant taxa.

Change *Glyptotendipes* prob. *barbipes* to *Glyptotendipes barbipes*
Change *Parachironomus hirtalatus* to *Parachironomus "hirtalatus"* (sensu Simpson and Bode, 1980)
After *Parachironomus hirtalatus* add *Polypedilum (Pentapedilum) tritum*

Volume II, P. 8-6, Replaces Table 8-2 (In Part). Macroinvertebrate cold water taxa list.

Crustacea
- *Gammarus minus*

Ephemeroptera
- *Ameletus sp.*
- *Baetis brunneicolor*
- *Baetis tricaudatus*
- *Epeorus sp.*
- *Maccaffertium ithaca*
- *Maccaffertium modestum*
- *Habrophlebia vibrans*
- *Habrophlebiodes sp.*
- *Dannella simplex*
- *Litobrancha recurvata*

Odonata
- *Boyeria grafiana*
- *Lanthus sp.*
- *Lanthus parvulus*

Plecoptera
- *Peltoperla sp.*
- *Amphinemura sp.*
- *Soyedina sp.*
- *Leuctra sp.*
- *Eccoptura xanthenes*
- *Haploperla brevis*
- *Sweltsa sp.*

Megaloptera
- *Nigronia fasciata*

Trichoptera
- *Dolophilodes distinctus*
- *Wormaldia sp.*
- *Wormaldia moesta*
- *Ceratopsyche slossonae*
- *Ceratopsyche ventura*
- *Diplectrona sp.*
- *Diplectrona metaqui*
- *Diplectrona modesta*
- *Parapsyche sp.*
- *Parapsyche apicalis*

Rhyacophila sp. (excluding *R. lobifera*)
Rhyacophila carolina
Rhyacophila fesestra or *R. ledra*
Rhyacophila glaberrima
Rhyacophila invaria complex
Rhyacophila minor
Rhyacophila torva
Agapetus sp.
Glossosoma sp.
Oligostomis pardalis
Frenesia sp.
Goera sp.
Lepidostoma sp.
Psilotreta sp.
Psilotreta indecisa
Psilotreta rufa
Molanna sp.
Diptera
Dicranota sp.
Pedicia sp.
Protothaumalea americana
Apsectrotanypus johnsoni
Brundiniella eumorpha
Macropelopia sp.
Meropelopia sp.
Radotanypus florens
Trissopelopia ogemawi
Zavrelimyia sp.
Diamesa sp.
Pagastia orthogonia
Odontomesa ferringtoni
Prodiamesa olivacea
Brillia parva
Chaetocladius piger
Corynoneura ascensa
Eukiefferiella devonica group
Heleniella sp.
Heterotrissocladius marcidus
Metriocnemus sp.
Metriocnemus eurynotus
Parachaetocladius sp.
Parametriocnemus sp.
Psilometriocnemus triannulatus
Rheocricotopus eminellobus
Thienemanniella boltoni
Polypedilum (P.) albicorne
Polypedilum (P.) aviceps
"Constempellina" n. sp. 1
Micropsectra sp.
Neostempellina reissi
Neozavrelia sp. 1
Paratanytarsus longistilus
Stempellinella boltoni
Zavrelia aristata
Clinocera (Clin.) sp.
Neoplasta sp.

Definition

Cold water macroinvertebrates are taxa that primarily inhabit streams that maintain a summer water temperature below about 20°C. Cold water taxa were in part chosen by analysis of the 25th, 50th and 75th percentile statistics of the number of cold water taxa at a taxon's collection sites during the summer collection period (June 15 to September 30). Cold water taxa generally were expected to have the 50th %ile $\geq$3. Information in the published scientific literature was also considered when assigning taxa to the cold water list. Percentile breakdowns for each cold water taxon and literature references relevant to the assessment process noted above are available upon request from the Ohio EPA.

Volume II, P. 8-13, Replaces Table 8-3. Narrative ranges and WWH biocriteria (bold) for Ohio ecoregions. Exceptional (EWH biocriteria), very good (EWH nonsignificant departure), poor and very poor evaluations are common statewide. For WWH, the ranges of marginally good and nonsignificant departure are the same (except in HELP, see Table).

IBI			**MIwb**		**ICI**	**Narrative Evaluation**
Headwater	Wading	Boat	Wading	Boat	All	
50-60	50-60	48-60	≥9.4	≥9.6	46-60	Exceptional
46-49	46-49	44-47	8.9-9.3	9.1-9.5	42-44	Very Good
Eastern Corn Belt Plains						
40-45	**40**-45	**42**-43	**8.3**-8.8	**8.5**-9.0	**36**-40	Good
36-39	36-39	38-41	7.8-8.2	8.0-8.4	32-34	Marginally Good
28-35	28-35	26-37	5.9-7.7	6.4-7.9	14-30	Fair
Erie Ontario Lake Plain						
40-45	**38**-45	**40**-43	**7.9**-8.8	**8.7**-9.0	**34**-40	Good
36-39	34-37	36-39	7.4-7.8	8.2-8.6	30-32	Marginally Good
28-35	28-33	26-35	5.9-7.3	6.4-8.1	14-28	Fair
Western Allegheny Plateau						
44-45	**44**-45	**40**-43	**8.4**-8.8	**8.6**-9.0	**36**-40	Good
40-43	40-43	36-39	7.9-8.3	8.1-8.5	32-34	Marginally Good
28-39	28-39	26-35	5.9-7.8	6.4-8.0	14-30	Fair
Interior Plateau						
40-45	**40**-45	**38**-43	**8.1**-8.8	**8.7**-9.0	**30**-40	Good
36-39	36-39	34-37	7.6-8.0	8.2-8.6	26-28	Marginally Good
28-35	28-35	26-33	5.9-7.5	6.4-8.1	14-24	Fair
Huron Erie Lake Plain						
40-45	38-45	38-43	7.9-8.8	**8.6**-9.0	**34**-40	Good
36-39	34-37	**34**-37	7.4-7.8	8.1-8.5	30-32	Marginally Good
28-35	28-(**32**) 33	26-33	5.9-**7.3**	6.4-8.0	14-28	Fair
24-27	28-31	30-33	6.8-7.2	8.1-8.5	30-32	Nonsignificant Departure
18-27	18-27	16-25	4.5-5.8	5.0-6.3	8-12	Poor
12-17	12-17	12-15	0-4.4	0-4.9	≤6	Very Poor